THE IRON AGE — September 13, 1934

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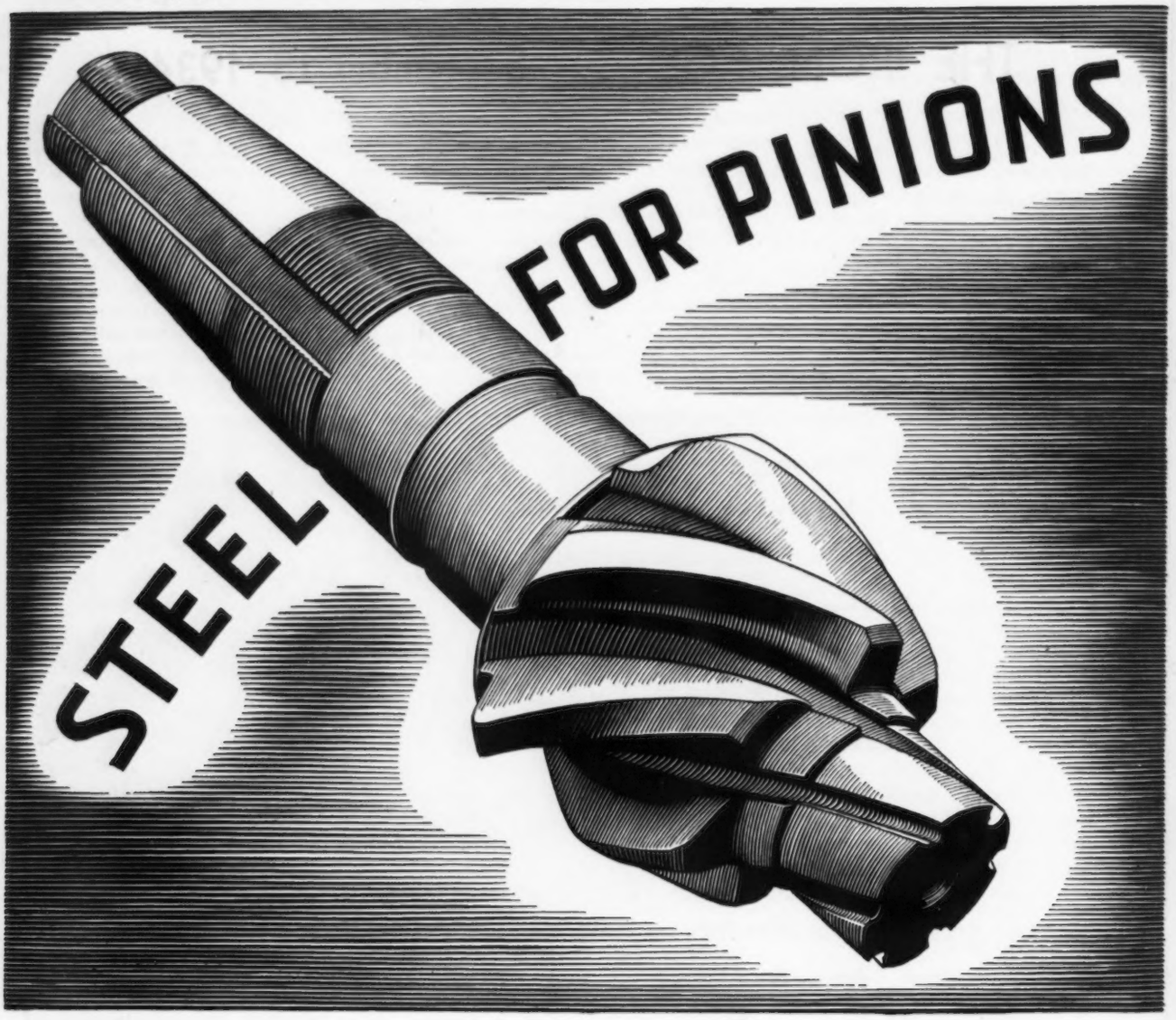

FOR this highly-stressed part a nickel-molybdenum carburizing steel, usually of an analysis corresponding to S. A. E. 4615, is generally considered to offer the best possibilities for obtaining both the hard surface that insures wearing properties and the tough core that imparts strength.

But this moderate degree of uniformity in practice with respect to analysis by no means makes the buying of the steel a cut-and-dried matter. In many characteristics, particularly those affecting operations in the automobile plant, steels made to the same specifications may vary widely.

Upon those matters of immediate vital concern to the automotive manufacturer, namely, machinability and uniformity of heat-treating characteristics, Bethlehem has brought to bear every resource of knowledge and skill. Bethlehem's experience on these problems has been acquired through years of living with the steel problems of the automotive industry.

With Bethlehem Nickel-Molybdenum Gear Steel heat after heat moves smoothly through the factory's heat-treating department. The number of gears per grind on the gear generator can be pushed up to a figure that means real savings in machining cost. Tooth strength is the highest that the analysis is capable of developing. Warpage is at a minimum.

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SEPTEMBER 13, 1934

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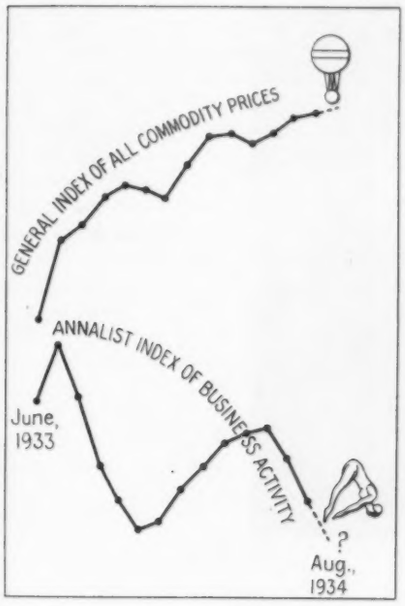


Business Recovery

HERE is a chart that the "new dealers" do not exhibit. It shows the trend of business activity since the inauguration of the Recovery Act, in June, 1933, as compared with commodity prices.

The curve at the top of this chart shows the trend of commodity prices during the last 14 months. The commodity price curve of course reflects wage rises and the attempt of the "brain trust" to supplant supply and demand by a regimented price economy.

The curve at the bottom of the chart shows the trend of general business activity as reflected by the "Annalist" index. Business activity reflects hours of employment and total wages, as well as business profits, which of course depend upon volume. In other words, this lower curve reflects purchasing power.

Note the marked divergence of the two curves. This means that the moving finger has written indelibly upon the wall that "you cannot lift yourselves by your bootstraps."

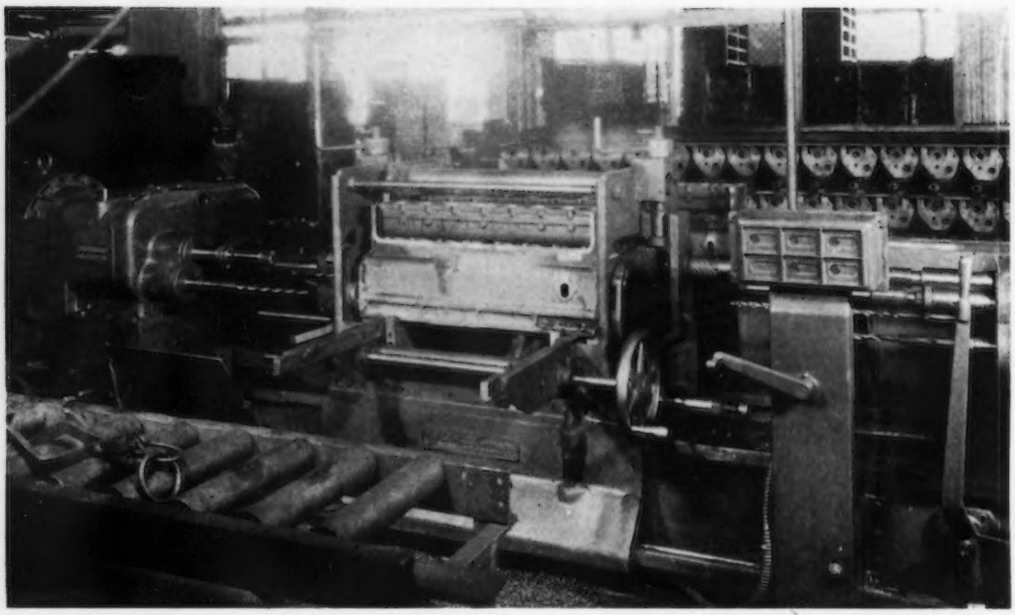
In writing this indelible record, the moving finger has also written the epitaph of the present "left wing" phase of the new deal.

The Wallaces and the Tugwells and the Perkins have had 14 months of uncontested experimentation in economic theory—at the expense of the American public. The result of this is that we now find prices 15 per cent higher than they were in June, 1933, and business activity—which represents total wages and employment—13.2 per cent lower.

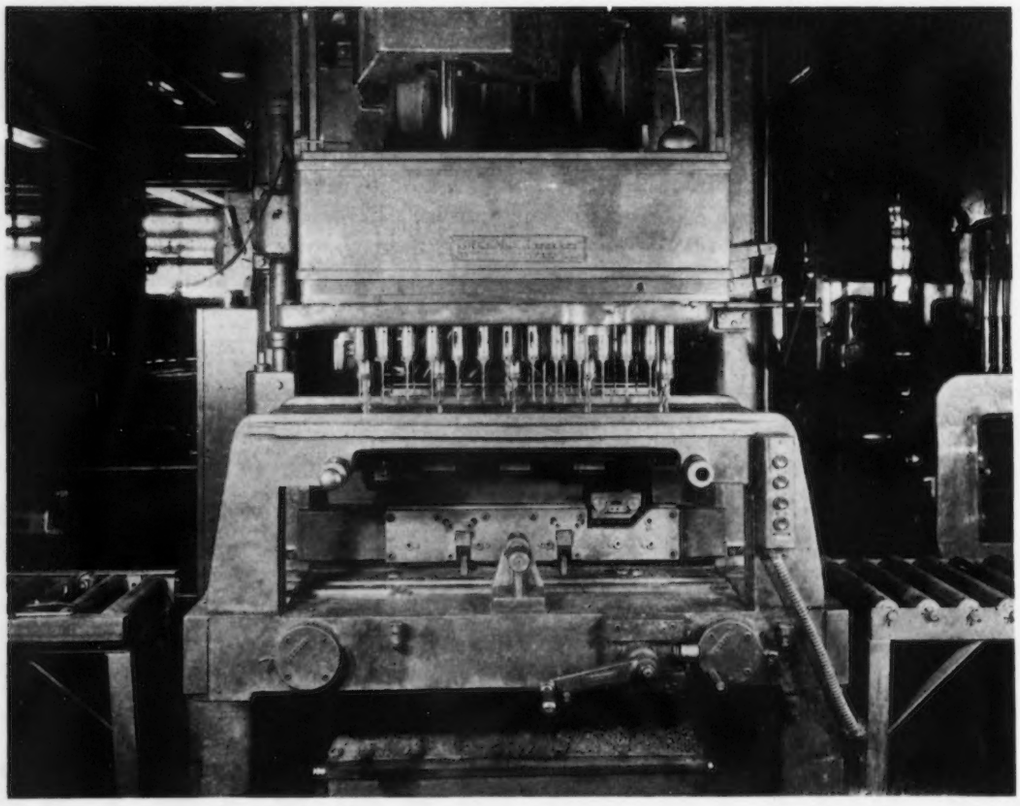
According to the latest bulletin of the League of Nations, the United States stood in eleventh place in rate of recovery since last May as measured by rate of industrial activity. Only four nations, Czechoslovakia, Belgium, Austria and Poland made a poorer showing.

This will not mean much to the millions who are on the receiving end of the Government's stupendous "hand out" line, but it will mean a great deal to the many more millions who still have to earn what they spend and who find a progressive shrinkage, week after week, between price and pocket book.

Machining Work on the



A Greenlee two-way horizontal combination drilling and boring machine, arranged with hydraulic feed, is used to drill the oil gallery and rough bore the camshaft and crankshaft bearings in the crankcase.



The top, bottom and waterjacket side of the crankcase are drilled on a Greenlee three-way horizontal and vertical multiple-spindle drilling machine with hydraulic feed.

Buick 40—I ▲ ▲ ▲

IN introducing its Model 40, Buick aimed to maintain the high quality always associated with its cars and, at the same time, get production costs down sufficiently to justify the low retail price established. To accomplish this it turned to the use of machine tools of the latest type, some of which are described in the accompanying article. Other pieces of equipment for machining the cylinder block and crankshaft will be described in the next issue.

TO expand the market for its products the Buick Motor Co. recently supplemented its line of larger cars with a smaller straight eight, known as model 40, to sell at the lowest retail price in the company's history. In introducing this new car, Buick has aimed to maintain the high quality which has been built into all its automobiles since the beginning and, at the same time, get production costs down sufficiently to justify the low price established. The best and quickest means of accomplishing this purpose was to install machine tools of the latest design which make possible the cutting of unit costs to the minimum. This article describes a number of new pieces of equipment now in operation at Buick's Flint, Mich., plant in machining the cylinder block and forged steel crankshaft of model 40.

The distributor, generator and spring clip bosses on the cylinder block are machined on a five-spindle traveling table type Ingersoll milling machine. The top place and housings carry the built-in spindles which are arranged in their proper positions for performing this operation. An electric feed box controls the reciprocating feed cycle, which consists of the table feeding forward to mill the two spring clip bosses and then reversing to mill the generator and distributor pads and the remainder of the spring clip bosses. At the completion of the feeding cycle, the table returns quickly to the loading position and the machine stops. Production of 46 blocks per hour is high for this type of work on account of the rapid traverse and fast speed rates made possible by the unusual design of the feed box.

Drilling Crankcase

The top, bottom and waterjacket side of the crankcase are drilled on a Greenlee three-way horizontal and vertical multiple-spindle drilling machine with hydraulic feed. The machine stands directly in the conveyor line, the work passing into the machine at one side and out at the other.

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The distributor, generator and spring clip bosses on the cylinder block are machined on a five-spindle traveling table type Ingersoll milling machine.

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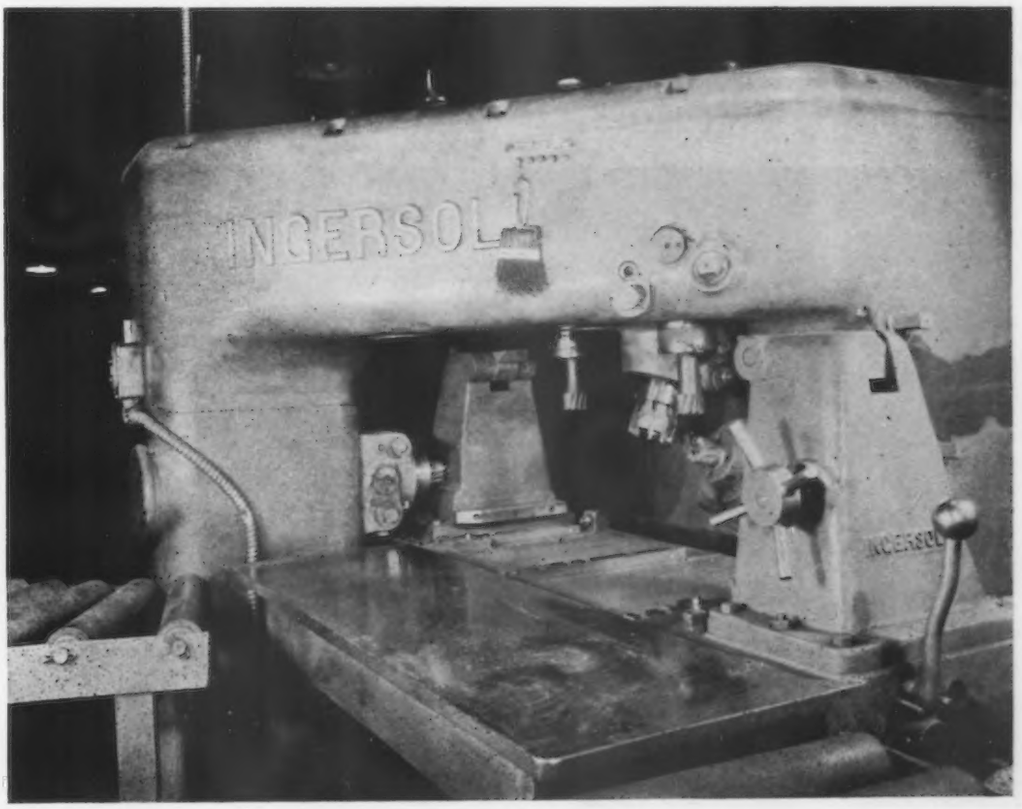

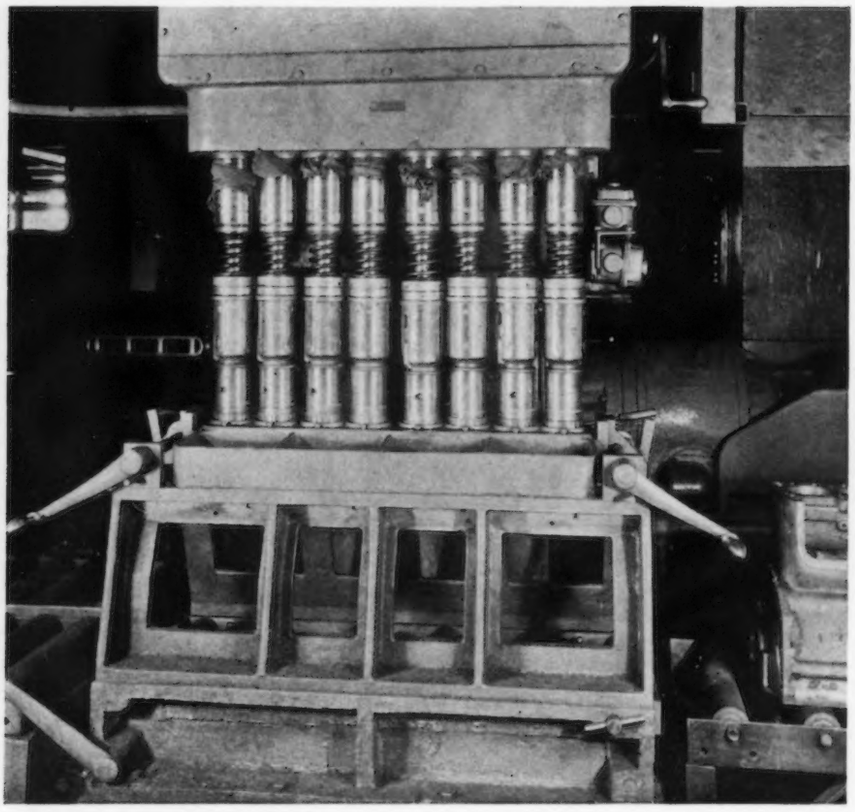

Top and bottom of the cylinder bores are chamfered on a Foote-Burt eight-spindle, hydraulically operated machine

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As it enters the fixture, the bottom face of the crankcase is up and the waterjacket side at the rear. After the work is roughly located, it is raised into machining position and clamped by means of the raising action of the elevating platform through rack and pinion actuated cams operated by the crank at the lower right front of the fixture. The upper vertical head drills the bottom, the lower vertical head drilling the top and the rear horizontal head the waterjacket side.

Holes drilled on this machine are as follows:

Upper Vertical Head

28-G (0.261 in. dia.) holes for 5/16-18 tap

2-O (0.316 in. dia.) holes for ⅜-16 tap

10-27/64 in. holes for ½-13 tap

5-15/64 in. holes for 0.250-0.251 in. ream

Lower Vertical Head

4 5/16 in. dia. holes

8 ⅜ in. dia. holes

2 7/16 in. dia. holes

1 ½ in. dia. holes

2 9/16 in. dia. holes

2-U (0.368 in. dia) holes for 7/16-14 tap

Rear Horizontal Head

3-G (0.261 in. dia.) holes for 5/16-18 tap

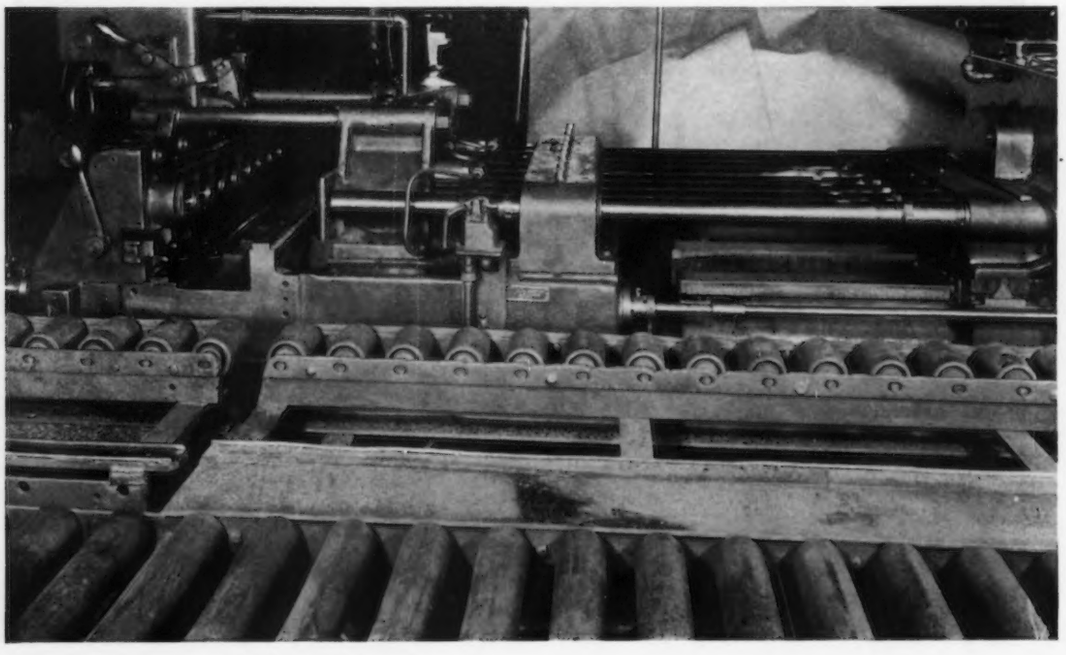
5-O (0.316 in. dia.) holes for ⅜-16 tap

1 29/64 in. dia. hole for ¼ in. pipe tap

For the drilling of the oil gallery and the rough boring of the camshaft and crankshaft bearings in the crankcase, a Greenlee two-way horizontal hydraulic feed combination drilling and boring machine is used. This machine has a two-position fixture. The work enters at the front from the loading position and progresses through the two working positions to the rear, where it is discharged onto a conveyor.

In the first position the left-hand head has two spindles, one for rough boring the No. 5 camshaft bearing and one for drilling the 19/32-in. oil gallery approximately 8 in. deep. The right-hand head also has two spindles, one for rough boring Nos. 1 and 2 camshaft bearings with a double diameter cutter and one for drilling the 19/32-in. oil gallery 8 in. deep.

In the second position the left-hand head has two spindles. One completes the drilling of the oil gallery. The second, which is a special spindle driven from the left-hand head but with an auxiliary cam feed actuated through the movement of the hydraulically-fed left-hand slide, rough bores the camshaft bearings.



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The second cut on the cylinder bores, termed a straightening operation, is performed on a Foote-Burt eight-spindle horizontal type cylinder boring machine with hydraulic unit.

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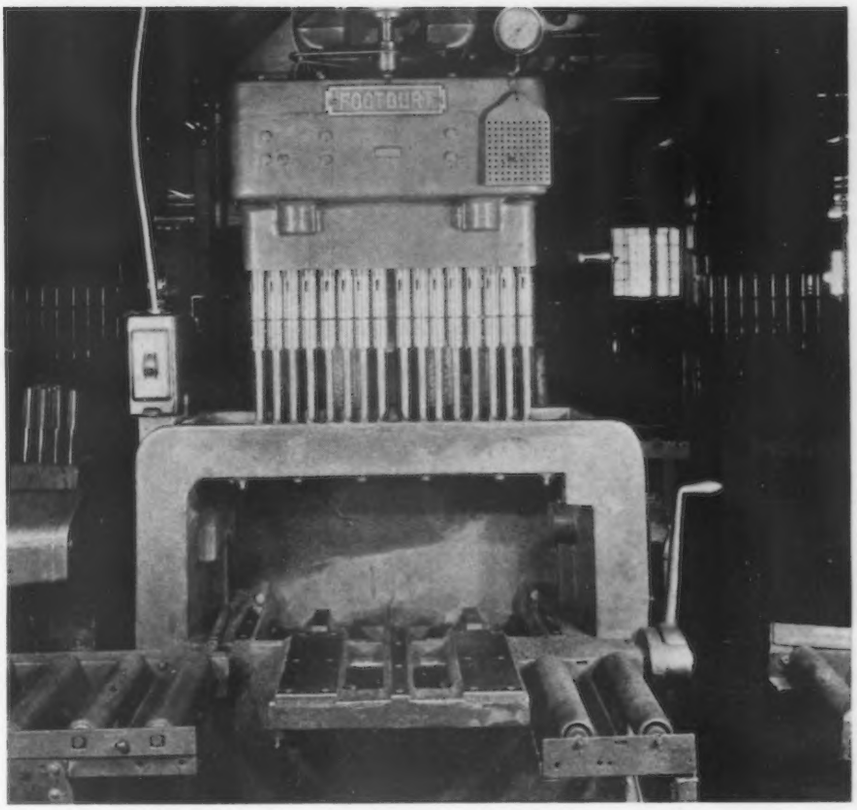
Since the work comes to this machine without the main bearing caps assembled, it is not necessary to withdraw the crank bearing boring bar for loading or unloading. The length of the feeding stroke of this bar is only sufficient to bore the longest bearing, namely the rear bearing. Rapid advance of the boring bar is not required. The auxiliary cam takes care of these functions.

Separate Hydraulic Heads

Because of the fact that in the second position the oil gallery is completed, it is essential that the drills from the right hand and left hand head have overlapping strokes, thus requiring a separate hydraulic feed system for each head. The two hydraulic systems are controlled from one operating lever, which in addition to starting the heads through their cycle provides an instant emergency reversal of both heads at any point in the cycle. For set-up purposes each head has auxiliary control levers.

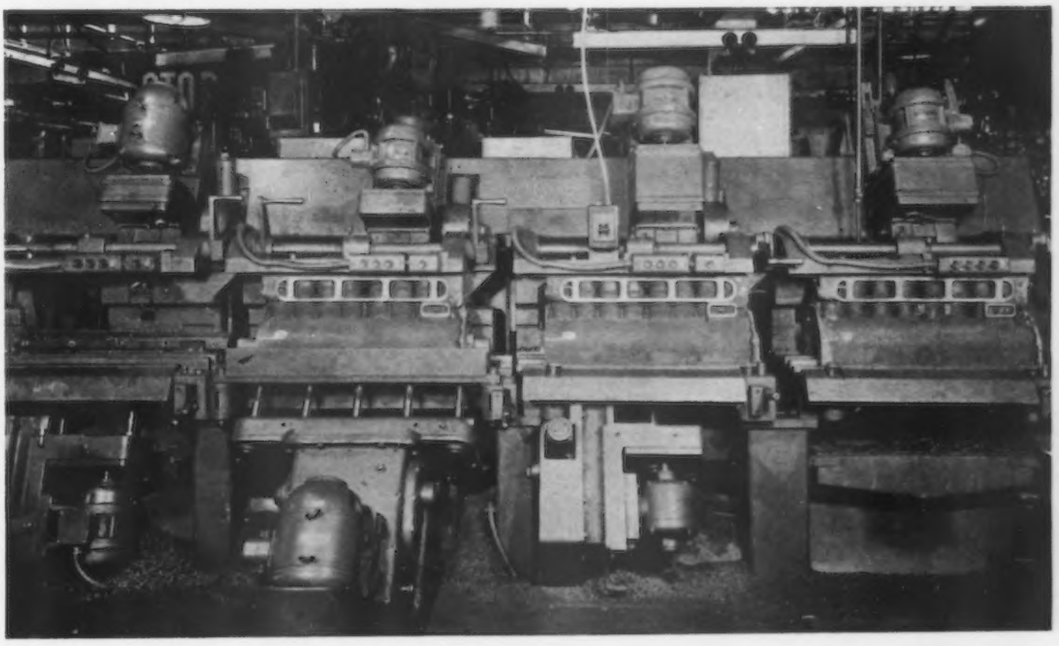
Tool guide bushings are provided over which the work must be loaded. To facilitate loading, an hydraulically-operated elevating device is used. It extends from the conveyor at the front of the machine to the conveyor at the rear. While the operations are being performed in positions 1 and 2, work may be moved directly from the conveyor onto the elevating device at the front and the completed work passed onto the conveyor at the rear. When the elevating device is up, a handwheel at the right front of the fixture is used to advance all pieces of work to the next successive station, discharging one completed piece and supplying one piece to be machined.



A Foote-Burt 16-spindle hydraulic feed drilling machine is employed for final finish reaming the valve lifter guide holes in the cylinder block.

The machine is completely interlocked mechanically to insure proper sequence of the various functions. That is, the heads cannot be started forward unless the elevating device has been lowered and the work properly clamped, nor can the elevating device be operated to raise the work unless both heads have returned to their neutral position. Likewise, the transfer bars must be returned to the front position before the work can be lowered into the operating positions,

(Concluded on page 88)



Various operations on the miscellaneous angular holes in the crankcase are performed on a Greenlee special four-station straight-line combination drilling, chamfering and tapping machine.

The Place of the Enameled Steel

By LeROY W. ALLISON and MALCOLM B. CATLIN

IN tracing the progress and prospects of porcelain enameled steel buildings, the steel house presents a rather alluring picture. Recent careful national surveys indicate some 300,000 potential purchasers of small homes today: how many of these can be sold an all-steel enameled house when the buying movement returns? While purely a matter of guess work, if only a fair percentage can be influenced to give an affirmative answer, it will open up the way for a most attractive outlet for the product of the sheet steel mill and the enameling plant. Each buyer will beget another, and the success of the steel dwelling will be assured.

The attainments that have followed the use of enameled steel in commercial and business structures have prompted some notable developments in the past few years, especially during 1933, in house construction, particularly one-family residences. Those intimately associated with this radical departure from conventional type homes are enthusiastic over the possibilities of the all-steel enameled dwelling, including architects who have been giving intensive study to this new trend. All are of the firm belief that it is one of the definite types of homes of the future.

Extensive research and experiments on the part of sheet steel manufacturers and enameling interests, with the cooperation of progressive architects, are responsible for the present status of the steel dwelling. Porcelain enameled houses have been built and are available for inspection. While the material generally might seem to have certain handicaps for construction of this character, it has certain definite qualifications, on the other hand, that respond readily to the demands of residential buildings. Backed by the

The house of the Ferro Enamel Corpn., Cleveland, has enameled steel walls and roof carried on steel studding.

House

BESIDES giving a comprehensive survey of the place being won by the house sheathed with enameled-metal panels and tiles, the author here also touches on the use of metal enameling for architectural decorations and for large-scale advertising signs. This article is the third devoted to applications of enameled steel sheets in building construction by the same authors (The Iron Age of June 21, July 5 and Sept. 6). In subsequent issues will appear discussions of details of enameling technique.

The Bremmer design is of enameled panels for the lower part of the wall with enameled shingles above and enameled shingles of a contrasting color for the roof.

live and progressive manufacturers of raw materials and finished enamel sheets, willing to expend time and money on a worth-while project of such encouraging proportions, it is more than likely that enameled steel houses will bring active competition with different types of residence construction in the months ahead.

One thing sure, the results to date show sound accomplishments in architectural innovation, and certainly no other group of building interests has made such substantial progress in recent years. There has always been certain evolution in architecture, and in this instance it has been inspired in an entirely new channel through the enterprise of various steel mills and enameling plants.

The first all-steel porcelain enameled house was designed by Charles Bacon Rowley and Associates, Cleveland, architects and engineers, engaging in active cooperation with the Ferro Enamel Corpn., of the same city. The residence was built in 1932 on Campus Drive, near Notre Dame College in that city, and was officially opened in October of that year.

This structure is of eight-room type, built entirely of porcelain enameled steel. Fabricated steel studs were used for the framework. Designed in the form of shallow rectangular panels, backed with Celetex, or fiberboard, these steel sheets are fastened to the studs by a special method of bolts and battens. The wall thickness is about 6 in., insulated with mineral wool. The porcelain enamel exterior is of matte glaze porcelain, resembling a rich buff limestone in color. The roof is formed of porcelain enameled shingles. Many interior features of the house are of this material, including bathroom, kitchen, lavatories and a basement recreation room. This dwelling has attracted wide attention; it has been visited and inspected by hundreds of people throughout the Cleveland district. As will be noted from illustration, the house has been designed in the English Georgian cottage style.

Closely following this first porcelain-steel residence, the American Rolling Mill Co., Middletown, Ohio, another prominent sponsor of this new type of dwelling, erected a house at Solon, Ohio, employing an entirely new structural system, commonly referred to as frameless steel, designed and perfected by Millis G. Clark, president of the Insulated Steel Co., Cleveland. Under this method the structural unit is arranged in the form of a shallow pressed steel pan, partly assembled with the wall sections in the shop, the remainder of such work being carried out in the field. It is a distinct departure from the usual steel stud frame type construction. The exterior walls of this house were handled much the same as in the case of the Cleveland dwelling, previously noted, similarly insulated and covered with porcelain enameled steel shingles. The floor sheets under this method of building are formed of lapped-over structural Z-sections, welded.

Further substantial progress was made with the porcelain enameled steel house at the Century of Progress Exposition, Chicago, where two different model homes were built. These aroused marked attention and comment. One of the structures was known as the Armco-Ferro house, a joint product of the American Rolling Mill Co., and the Ferro Enamel Corpn. The other residence was the well-advertised Stran-Steel building, sponsored by *Good Housekeeping*, and built by the Stran-Steel Corpn., in cooperation with the Republic Steel Corpn., and the Porcelain Enamel & Mfg. Co., Baltimore.

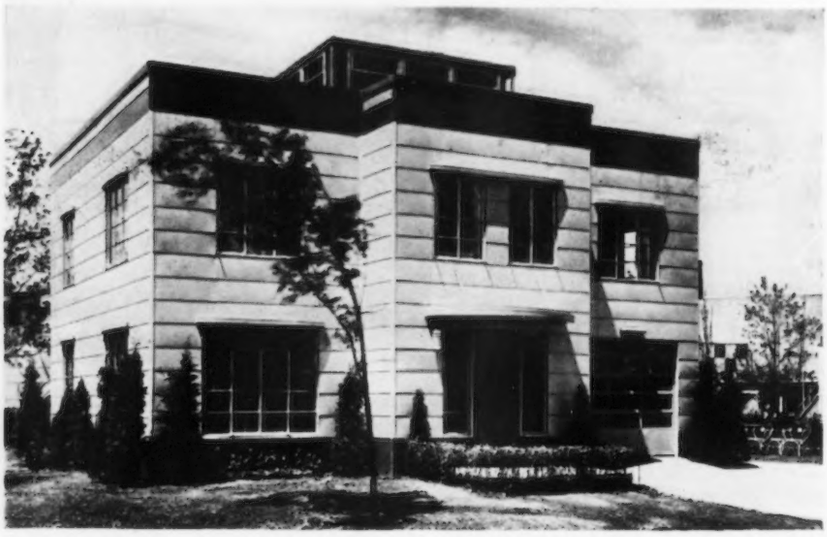
The Armco-Ferro home was of two-story, frameless steel type, or similar to the Solon, Ohio, dwelling, noted above. The exterior was of 18-gage porcelain enameled steel, formed in strips 13 in. wide, with edges crimped to provide waterproof joints. The color motif was of peach blend in two tones. It was announced that there was not "a piece of steel in this house

thicker than a dime," the frameless system of construction eliminating studs, joists, rafters, etc., these being formed of welded sheet metal shapes. The cost of such a home to the prospective owner was stated to be $5,000.

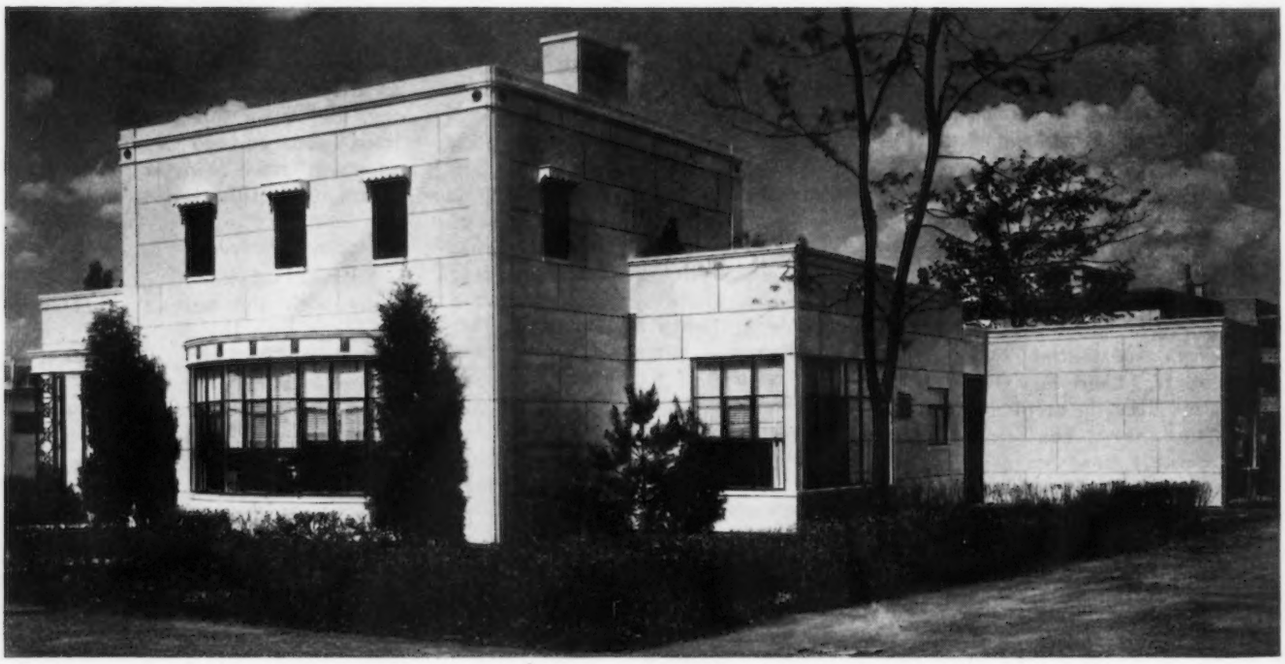
The Stran-Steel house was described in THE IRON AGE, Aug. 10, 1933, pages 20-21. Briefly, this unit employs a framework of cold-rolled steel strips, to which building materials are fastened by a patented nailing method. Steel of 16-gage is used, rolled and assembled into joists, studs and rafters, these being covered with rust-resisting paint. The exterior walls are of large size slabs or panels, 24 in. wide, 8 to 10 ft. long (with some smaller sections, as required) and 1¾ in. thick, formed of a material known as "Glasiron Macotta," a product of the Maul Macotta Corpn., Detroit, consisting of stainless porcelain enamel fused on Toncan iron of the Republic Steel Corpn. These enameled iron panels are backed with Haydite and cork concrete for insulation purposes. The panel units in this building, designed in cream color, were edged with Enduro stainless steel, another product of the Republic organization, to eliminate corrosion at the joints. The cost of this home on the Exposition grounds was given as $9,000.

The two porcelain enameled houses at Chicago made a decided change from the earlier use of steel shingles for wall exteriors, utilizing enameled panels in the stead. This departure may have been inspired possibly by architectural comment that the enameled shingle unit has a certain monotony and flatness of surface and texture, not entirely harmonious for various distinctive modern dwelling effects. This can hardly be said, however, of the enameled panel or sheet, which is not handicapped by any such natural limitations and can be developed in any reasonable desired size.

The latter reference is interesting in connection with another development of the porcelain-steel house, using both panels and shingles for



The Armco-Ferro house, at the Century of Progress Exposition, Chicago, has an exterior of enameled strips 13 in. wide



The Stran-Steel house, at the Century of Progress Exposition, Chicago, has an exterior of enameled strips 24 in. wide

exterior architecture. This dwelling follows the design of Harry F. Bremmer, Cleveland, architect, the initial unit, here reproduced, being one of a proposed group of such type dwellings. The exterior walls are covered with porcelain enameled steel panels up to the second floor level and above that point with enameled steel shingles. The roof is formed of the latter material in contrasting color. In the designing, an effort was made to retain traditional and conventional lines, in order to develop pre-fabricated steel units in the shop to cover the entire group of dwellings, with greatest economy and ease in field erection.

A reference to the porcelain enameled steel house would not be complete without including the structure completed early this year by the Wheeling Corrugating Co., Wheeling, W. Va., in the residential section of that city. This unit was designed by Charles Bacon Rowley and Associates, architects, and represents another type of steel dwelling of particular merit. It employs a distinctly novel method of applying the exterior steel enameled sheets.

The wall sections, of 20-gage, one-story high, are erected on top of and welded to a steel plate, which is placed on and securely fastened to the foundation masonry. The wall sections are designed not only to serve as bearing members, but as a surface to which the exterior and interior finished walls are attached. Another steel plate covers the top of the first story wall sections and the second story wall section, similarly, rests on and is welded to this steel plate. The exterior wall panels of porcelain enameled steel range in size from 2½ ft. wide and 4 ft. long, to 6 in. wide and 2 ft. long, about ½-in. thick. The edges of the panels are shaped to engage with special fastening devices on the wall sections. In applying the exterior wall panels, furring strips are accurately spaced and welded horizontally; stainless steel screws with a washer project over the flanged edges of the panels when applied to the furring. The enameled panels are of a light gray background, with dark gray sprayed over; at the corners and pilasters, this color scheme is reversed, being of a dark blue gray tone and lighter gray sprayed over this background. The flat roof utilizes red quarry tile, 9 x 9 in., as the finished surface, providing a roof deck around the pent house for rest and recreation.

Enameled Sheet Panels in General

From the standpoint of fabrication, the production of sheet steel panels for architectural service of this character presents no particular difficulties other than the necessity for care in avoiding warpage, as well as possible surface defects that later might lead to the exposure of parts of the base metal to the weather. In fusing porcelain enamel to steel or iron, there is always a tendency for the enamel to pull away from sharp edges; for this reason, the latter must be avoided, or otherwise provided for in the structural system. In flanged or pan-type panels, the edges, of course, are turned back, eliminating the necessity for the considerations noted.

Naturally, flat steel panels must be covered with battens or engaged with a clipping device, sealed with a waterproof mastic, when used on the job. The steel buildings erected up to this date do not appear to have sustained any loss or deterioration in this direction, indicating that the problem is one of reasonably easy solution.

It is rather problematical, at least at this time, to say just how far the porcelain-steel house can be developed, with respect to cost factor, to meet the future demand (according to all surveys) for the really low-cost home. Enameling interests are still indefinite on this subject, as the field is so new and moreover, because much of the work in this line to date is of special and experimental character. Consequently, it does not indicate what real basic economies can be made by pre-fabricated methods under actual mass production.

The enameled steel sheet alone can hardly be expected to solve the low-cost home problem, nor for that matter any other exterior finish panel. If steel houses can be erected to interest the prospective purchaser of the modest dwelling, it will come through the combined savings in different structural as well as interior features, all tending to the one main end.

On the other hand, for residences of the larger and better class, porcelain enamel on steel already has earned the right to be considered,

The Budweiser sign includes the trade-mark made up of 21 fabricated pieces of metal finished in 13 different colors or shades of enamel and, counting the clock face, presents nearly 580 sq. ft. of porcelain enameled surface.

and the coming months undoubtedly will show proof of this claim.

Enameled Steel Tile

The porcelain enameled steel or iron wall tile is intimately associated with the all-steel house. Numerous examples may be found of the utility of this product for bathrooms, kitchens, lavoratories and other domestic quarters, as well as for the interior of stores and similar commercial structures.

One of the first companies to give attention and research to the enameled tile was the Chicago Foundry Co., Chicago. A light-weight cast unit of this kind was developed and manufactured in commercial quantity. The tile is fastened to the wall by means of interlocking lugs and screws. The material is produced in a variety of popular colors and shades. The enameled iron tile units can be installed on new or old walls, and with unskilled labor. They show a marked saving as compared with the cost of regular clay tile, and have much greater flexibility for different kinds of service than that material.

A few years ago a company was organized with headquarters at Chicago to perfect and manufacture an enameled steel tile of patented type, known as Porstelain, covering, as well, a standard system of installation for such units. Later on, this organization was acquired by the Youngstown Pressed Steel Co., Warren, Ohio, and is now operated as a unit of that company, under the name of the Porcelain Tile Co., with plant and offices at the same place. The trade name of Veos (vitreous enamel on steel) is now given to this product, or the same as that used by the parent organization for its well-known line of enameled steel sinks.

Two Standard Sizes Available

Under the new ownership, this steel tile unit is now being marketed through established agents in all parts of the country. They have a base of thin pressed steel, 24-gage, and are produced in two main standard sizes, 4½ x 4½ in., and 3 x 6 in., adhering closely to the regular dimensions of clay tile. They are made in a wide range of attractive colors and color combinations, with high glaze surface. Larger steel tile of this type also are manufactured, being 6 x 6 in., and 6 x 12 in., respectively. The smaller units, however, are the most popular and consequently form the bulk of output. The problem of crazing, so serious with clay tile, has been entirely overcome, it is said, with Veos tile, the fusing of the porcelain enamel on the steel giving a finished surface of durability and long life, free from chipping or crazing tendencies. The units are of particularly light weight, another advantage over the clay material, and are formed with flanged edges on all sides to make for a neat and effective joint.

Installation is carried out by first nailing to the wall a foundation board of fiber-asphalt, corresponding to the height of the tile wall, or to the ceiling if entire surface is to be covered. This composition board is grooved or slotted horizontally and vertically on 1½ in. centers. The flanged edges of the tile fit into these grooves, the tile units being attached with special cement and grouted in. Although the initial cost of production is higher with the porcelain-steel tile, as compared with clay units, the marked decrease in expense of installation, especially with respect to labor cost, brings the investment required for the enameled tile to an appreciably lower level, said to average about one-fifth to one-sixth of the ultimate cost of a clay tile wall installation.

Wide Application Possible

These porcelain enameled tiles are designed to provide for all character of wall tile requirements in homes and dwellings, as well as interiors of stores and other commercial establishments, dairies and similar industries where sanitation and cleanliness are important considerations. Markets and other food product stores, chain lunchrooms and the like, have been among the leading outlets for Veos wall tile. To date, about 10,000 installations have been made throughout the country. At the present time, the company is giving broad research and attention to the possibilitits of a porcelain enameled steel floor tile, in cooperation with the Pittsburgh Testing Laboratories.

Another organization active in the production of porcelain-steel tile is the Columbian Enameling & Stamping Co., Terre Haute, Ind., and its Porcelite units, as the tiles are known in the trade, have been marketed for several years. These tiles are manufactured in a wide variety of colors and shades, 25 or more in all. The units are of standard size, and in installation are mounted on a special warp-proof, waterproof wall board, being flanged for this purpose, much along the lines of the tiles previously described. In this instance, however, a slightly different system is employed through a special clipping device. The Columbian company, it may be added, also manufactures porcelain enameled shingles for houses and small commercial structures, and has the distinction of having installed the first roof in the country of such material, at Terre Haute in 1924.

Ornamental Enameled Products

A reference to architectural developments in the use of porcelain enamel on metal would not be complete without mention of distinctly ornamental products in this category both for exterior and interior purposes. Brief references to some recent outstanding examples will suffice, as the perfection in this art and the rapid progress now being made indicate no appreciable limit as to accomplishments in the future.

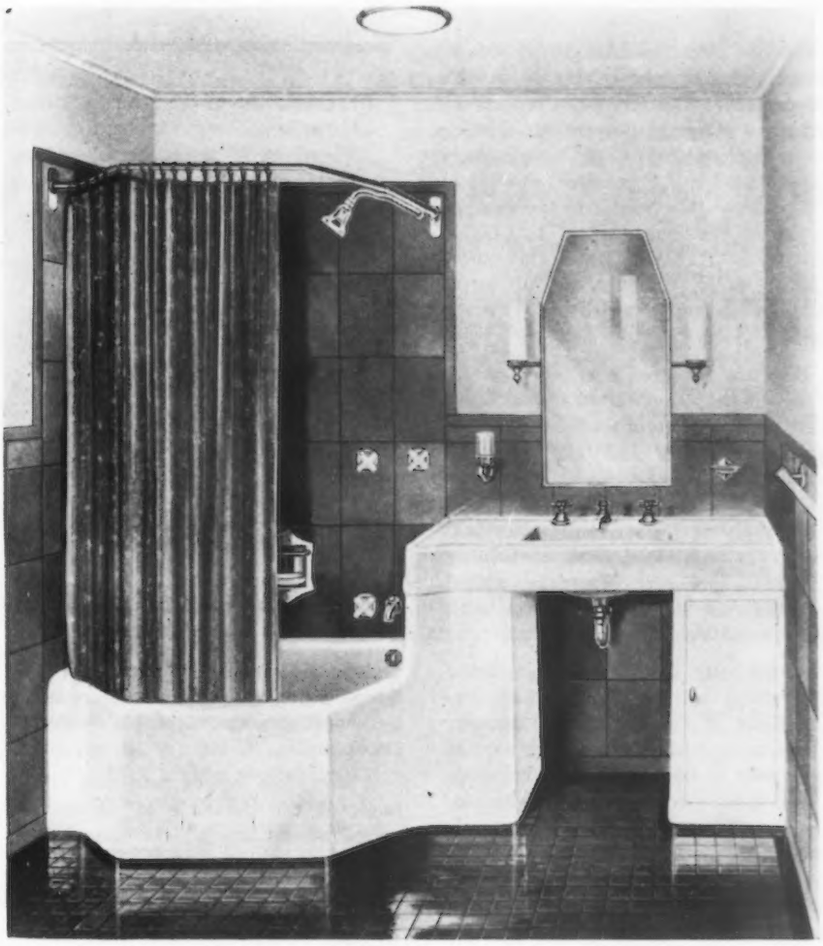
In this work, other metals are frequently employed with stainless steel to bring about the desired effects. A rather notable conception of porcelain enamel metal-working, as it may be termed, is found at the International Music Hall, Radio City, New York, where three ornamental porcelain enamel murals, depicting Song, Drama and Dance, adorn the exterior wall of the structure, 60 ft. above the street level. These murals or plaques, two of which are shown in accompanying illustrations, are of circular design, about 18 ft. in diameter. They are executed on a stainless steel base and make use, as well, of a number of other metals, including bronze, brass and copper, each having a specific function in the development of the plaques. The different pieces were enameled and then assembled, with a result that is original and startling. The design and rendering is the work of Miss Hildreth Meiere. These plaques tend to show that a new mode of exterior architectural decoration is on the way and one in which steel and other metals will take an important part.

Turning to interior murals, those now adorning the walls of the offices of the Ferro Enamel Corpn., Cleveland, give a pertinent example of what may be expected in the future with enameled metals. These porcelain enameled panels were illustrated in THE IRON AGE, Feb. 22, 1934, pages 24-25. They average about 3½ x 5 ft. in size. Each mural utilizes four to five colors, giving unusual contrasts in red, green, blue, black, white, etc. A base of Armco ingot iron is used.

Signs and Displays

While hardly to be considered in the direct line of architecture, enameled signs and displays have a direct

bearing in the widening market for steel and iron for porcelain enameling service. No reference is needed to the smaller sign units employed for every conceivable purpose for exterior and interior use. These are to be found in innumerable quantity and quality. Collectively, they represent an important branch of the metal enameling industry, absorbing a sizable tonnage of iron and steel annually.



Combination tub, shower and lavatory made in enameled cast iron.

An appreciation of the importance of porcelain enameled iron and steel for outdoor display purposes is shown in the large electric display of Anheuser-Busch, Inc., St. Louis, at the recent Century of Progress Exposition, Chicago, developed in the form of a mammoth chiming clock, augmented with the company trademark, towering above the exhibit buildings. The sign was 65 ft. high and 42 ft. wide, with a sizeable part of this area carried out in porcelain enamel; the latter comprised some exceptionally fine detail work. The complete trademark, including the eagle, noted, consisted of 21 fabricated pieces of metal, later assembled, executed in 13 different colors or shades of color. The application of the enamel to the base metal required the customary ground coat firing and nine additional firings for the individual colors. The enameling was carried out with the use of stencils, as well as considerable hand work to secure desired detail and effect.

The clock on this display, forming the main feature, was fabricated in 18 different sections, each averaging about 48 in. in width. There is approximately 528 sq. ft. of porcelain enamel in this part of the display, exclusive of hands and numerals. The faces of the two hands of the clock required close to 50 sq. ft. of porcelain enameled metal; the minute hand is 8½ ft. long. This sign was outlined and illuminated at night by neon tube lighting units. It was built by the General Outdoor Advertising Co., Chicago.

A still larger porcelain enameled electric display has just been completed for the Chevrolet Motor Co., overlooking Michigan Boulevard, Chicago, stated to be the largest such display in the world. This structure has an entire face of enameled steel. The unit is 148 ft. high and 150 ft. long, the bottom of the sign being 140 ft. above the street. With approximately 10,000 sq. ft. of surface, the entire display required about 330 tons of steel, and the majority of this is porcelain enameled. As an idea of the display proper, some individual figures are interesting—the Chevrolet trademark is outlined in 14-ft. letters; the monograph is 13 ft.; the electric clock is 50 ft. high, with a minute hand 27 ft. long, weighing close to 1000 lb. There are 21 miles of wire and cable in the unit, which was built by the Federal Electric Co., Chicago.

Combination Enameled Bathtub-Lavatory Fixture

A rather unique cast iron enameled bathroom fixture has been designed and placed on the market by the Lavashower Corpn., Philadelphia. phia, and is now being manufactured in quantity for that organization by the United States Sanitary Mfg. Co., Pittsburgh. This unit combines a bathtub, shower, lavatory and towel cabinet as a single compact fixture. The tub supports one end of the lavatory and is recessed under it, gaining this amount of floor space in installation, and eliminating, as well, the need for the usual pedestal support for lavatory. The tub section is of full standard length, with bottom practically flat, and with large part of area arranged for a convenient shower stall. The lavatory is 40 in. wide and suitable for further use as a dressing table. This fixture is designed especially for small bathrooms in apartments, modest dwellings, hotels, etc. It can be installed in a room as small as 5 ft. x 7 ft. in size. The porcelain enamel finish is available in white and a range of standard colors; the units are being made both for right-hand and left-hand recessed installations, as the case may be. The lavatory end is also finished for corner installations. This new fixture represents the second departure in recent months in bathroom equipment, the square tub, announced only a few weeks ago, being the first marked change in units of this kind for many years.

Continuing the survey of the enameled iron and steel industry, the author, in subsequent issues, will discuss details of enameling technique.

Influence of Manganese on

BY WERNER JELLINGHAUS

SLOWLY cooled manganese steels having carbon below 0.4 per cent are pearlitic when the manganese content is less than 6 per cent, martensitic with manganese between 6 and 13.5 per cent, and austenitic with that element exceeding 13.5 per cent. Steels with 2 per cent manganese up through the Hadfield type have been previously examined with regard to the influence of cooling speeds on the critical points, but this manuscript deals with corresponding phenomena for steels with Mn between 0.29 and 1.5 per cent. The speed of heating decidedly shifts the positions of the

AS a supplement to the work of F. Wever and N. Engel[1] concerning the influence of the speed of cooling on carbon steels, F. Wever and W. Jellinghaus[2] recently published extensive data concerning the influence of the alloying element chromium upon the conversions of carbon steels. Therefore it seemed desirable to extend such an investigation to other industrially important alloying elements, and the influence of manganese especially appeared deserving of notice. Somewhat simultaneous with the investigation of chromium steels, a series of experiments concerning the isothermic austenite decomposition were carried out by F. Wever, H. Lange and W. Jellinghaus.[3]

The results of this latter investigation seemed to make it appear worthwhile, especially with regard to further planned kinetic investigations, to again ascertain the influence of annealing temperature and time on the hardening ability. Experiments in this direction showed that the thermal process mentioned by F. Wever and N. Engel is not suitable in the form previously used. The advantages obtained by the choice of wires as the form for samples and hydrogen as the quenching agent were reversed when long annealing periods and high annealing temperatures were used. This came from the fact that the small cross-section of the sample and the high temperature of the hydrogen resulted in excessive decarbonization. This decarbonization must be taken into consideration during the investigation of the influence of manganese on the conversion of carbon steels. The process mentioned by Wever and Engel was used at first, but quenching in liquids was used for high cooling speeds. The numerical knowledge of the degree of cooling of numerous hardening agents obtained from the extensive experimental series of N. Engel[4] proved very valuable in this connection. The following report embraces a series of sub-eutectoid steels up to 0.92 per cent C with manganese contents up to 1.5 per cent. Steels of this composition belong to the pearlite group of the diagrams of L. Guillet[5] and of E. C. Bain, E. S. Davenport and W. S. N. Waring[6], and all agree in their structure synthesis with the carbon steels.

For this research a number of Mn steels in the form of wire were used. The carbon contents of these steels lay between 0.29 and 0.89 per cent, while the manganese contents amounted to 0.31 to 0.69 per cent. For supplying higher manganese contents four additional steels containing 1 and 1.5 per cent Mn were melted together and worked into wires with the laboratory apparatus.

In the case of the last mentioned manganese contents, a marked displacement of the conversion temperatures as compared with pure carbon steels was to be expected. Therefore a few determinations of the breaks were carried out with the aid of expansion-temperature curves at very low heating and cooling speeds of about 0.1 deg. per hr. The results are shown in Table 1.

During the heating an austenite formation does not appear under 710 to 720 deg., and in the case of sub-eutectoid steels the solution of the pearlite is ended at a temperature around 50 deg. or more under the A_3 points of unalloyed steels of the same carbon content. During the cooling off the beginning and end of the conversions are displaced 60 to 100 deg. toward lower temperatures in comparison with plain carbon steels.

Method of Thermal Analysis

For determining the conversion temperatures at increased cooling speeds the process mentioned by F. Wever and N. Engel was used. The wire samples were heated electrically to hardening temperatures, and after the heating current was disconnected they were quenched in hydrogen. The temperature measurements were taken by means of a thermocouple welded to the samples.

A complete and exhaustive treatment of the influence of manganese would necessitate a determination of the lower and upper critical speeds for the various investigated steels. However, this investigation was restricted in part to save means and time and in order to carry out the experiments with a comparatively few steel wires. The lowest cooling speeds are, therefore, mostly relatively high, whereas the upper critical speeds are not quite reached in the case of steels poor in carbon. The survey is, therefore, not entirely uninterrupted, but it is sufficiently inclusive to obtain an idea of the action of manganese on the hardening ability of the carbon steels.

The results of the thermal analyses are compiled in Table 2 according to the manganese contents, carbon contents and cooling speeds. For individual steels, curves 1 to 5 give the position of the conversion temperatures with respect to the cooling speeds.

A description of the experimental

Hardening Ability of Carbon Steels

critical points, and manganese even in small amounts appreciably lowers the Ar point. The experiments on which this article is based were conducted at the Kaiser-Wilhelm Institute for Iron Research at Düsseldorf, Germany, and the data were released by that institution. Major conclusions of the author are that Mn under 0.3 per cent exerts little influence, whereas Mn of 1 per cent and above greatly shifts the critical cooling speed, and the pearlite temperature is reduced by Mn additions as well as by increases of the cooling speed.

results is as follows: Steel B, 0.31 per cent Mn, 0.54 per cent C. For the lowest cooling speed of 40 deg. per hr. the A_3, A_2 and A_1 points fall together into a single thermal effect with vigorous subsequent heating at 643 deg. With increasing cooling speed the conversion temperature is further depressed. At the highest speed reached of 620 deg. per hr. a martensite point appears at 276 deg. for the first time. The conversion temperatures are represented in curve No. 1 with respect to the cooling speed.

Steel C, containing 0.31 per cent Mn and 0.64 per cent C, corresponds in its behavior entirely with steel B (compare the data in Table 2).

Steel LB 180, containing 0.32 per cent Mn and 0.85 per cent C was available only in a wire size of 0.6 mm. diameter. The lowest cooling speed was 550 deg. per hr., for which a pearlite point appeared at 497 deg. and a martensite point at 189 deg.

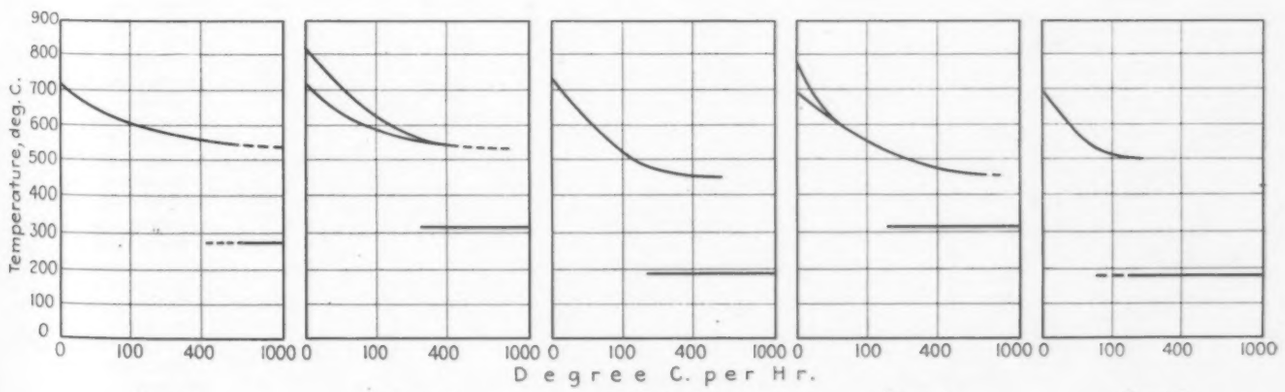
Steel E, contained 0.52 per cent Mn and 0.29 per cent C. At the lower cooling speeds, as shown in curve 2, the A_3 and A_1 points are separate. At 50 deg. per hr. the A_3 point lies at 657 deg. and the pearlite point at 632 deg. By increasing the cooling speed to 220 deg. per hr. the first point is depressed to 603 deg. and the latter point to 545 deg. At 260 deg. per hr. both conversion points coincide, and at 316 deg. per hr. a martensite point appears. The strength of the martensite point increases with increasing cooling speed at the expense of the pearlite point.

Steel K, contained 0.58 per cent Mn and 0.56 C. At 60 deg. per hr. the A_3 and A_1 conversions coincide at 553 deg. with an increased cooling speed, the conversion temperature drops to about 500 deg. at 300 deg. per hr., and there also appears at this speed a martensite point at 237 deg.

The data secured on steel K permit a comparison of the measuring process used with the kinetic measuring process employed by E. C. Bain[7], in

TABLE 1
Dilatometric Analyses of Four Types of Manganese Steels

No.	Mn Per Cent	C Per Cent	Heating	Heating Deg. C A_1	Heating Deg. C A_3	Cooling Deg. C A_2	Cooling Deg. C A_1
231	1.10	0.31	1	719	816	735	628
			2	709	813	738	626
229	1.09	0.95	1	716	735	677	656
			2	711	729	660	634
232	1.52	0.38	1	708	772	672	592
			2	709	782	693	602
230	1.48	0.78	1	713	734	650	628
			2	707	728	636	608



Curve 1. Steel B. 0.31 per cent Mn, 0.54 per cent C.

Curve 2. Steel E. 0.52 per cent Mn, 0.29 per cent C.

Curve 3. Steel H. 0.59 per cent Mn, 0.74 per cent C.

Curve 4. Steel No. 231. 1.10 per cent Mn, 0.31 per cent C.

Curve 5. Steel No. 229. 1.09 per cent Mn, 0.92 per cent C.

which the steel was quenched in a bath of constant temperature, where it was held a certain period, after which it was again quenched. The time of 3 hr. determined from the structure investigation for a complete conversion of the austenite into a steel containing 0.5 per cent Mn and 0.55 per cent C at 525 deg. agrees well for the two processes. A survey of the data in Table 2 shows that at a cooling speed of 200 deg. per hr. for a cooling from 900 deg. to the end of the A_1 conversion required 3½ hr. On the other hand, for a cooling speed of 300 deg. per hr. only about 2½ hr. were required, and in this case there also appeared a martensite point at a lower temperature.

Steel H having 0.59 per cent Mn and 0.74 per cent C is shown in curve 3. At 40 deg. per hr. there was observed a strong pearlite point with subsequent heating at 594 deg. At 80 deg. per hr. there was a drop in the pearlite point to 507 deg., and accompanying it is a martensite heat-point at 173 deg. At higher speeds the strength of the pearlite point is reduced.

For steel M having 0.58 per cent Mn and 0.81 per cent C there are shown several pearlitic points with strong subsequent heating at low cooling speeds of 45 to 90 deg. per hr. At a speed of 210 deg. per hr., in addition to a very weak pearlite point at 460 deg. per hr. there is a strong martensite point at 193 deg. At 520 deg. per hr. the pearlite point is only just perceivable.

For steel A having 0.60 per cent deg. Mn and 0.89 per cent C, the smallest cooling speed of 40 deg. per hr. is sufficient to completely suppress the pearlite point. The martensite point lies at about 160 deg., and at higher cooling speeds this point is not altered.

The difference in the steels M and A, in view of the small differences in

TABLE 2

Thermal Analyses and Structures of Manganese Steels

Designation of Steel	Mn Per Cent	C Per Cent	Speed Deg. C. per Hr.	A_3 Deg. C.	A_1 Deg. C.	Martensite Point	Structure
			Steel With 0.31 to 0.35 Per Cent Mn				
B	0.31	0.54	40	...	643	...	Ferrite and pearlite
			80	...	580	...	Ferrite and troostite
Curve 1			240	610 s.s.	561	...	A little ferrite and troostite
			330	...	568	...	Troostite
			400	...	538	...	Troostite
			600	...	503	258	Troostite and martensite
			620	...	537 st.	276 m.	Troostite and martensite
C	0.31	0.64	50	...	632	...	Troostite and pearlite
			80	...	560	...	A little ferrite and troostite
			220	...	545	...	Troostite
			320	...	548	...	Troostite
			570	...	495	260	Troostite and martensite
SS12	0.35	0.68	130	...	559	...	Troostite
LB180	0.32	0.85	550	...	497	189	A little troostite with much martensite
			Steel With 0.52 to 0.60 Per Cent Mn				
E	0.52	0.29	50	657	632	...	Ferrite and troostite
			90	608	579	...	Ferrite and troostite
Curve 2			220	603 s.	545	...	Ferrite and troostite
			260	...	548 st.	316 m.	Troostite and martensite
			300	...	556 st.	315 m.	Troostite and martensite
			740	...	519 st.	328 m.	Troostite and martensite
K	0.58	0.56	60	...	553	...	A little ferrite and pearlite
			100	...	555	...	Pearlite and troostite
			220	...	538	...	Troostite
			300	...	503 m.	237 m.	Troostite and martensite
			660	...	489 m.	259 st.	A little troostite with much martensite
	0.59	0.74	40	...	594	...	Ferrite and pearlite
H			80	...	507	173	Troostite and martensite
Curve 3			220	..	?	190	A little troostite and martensite
			250	..	458 s.	208 st.	A little troostite and martensite
			560	...	450 s.	234 st.	A little troostite and martensite
			1450	..	...	271	Martensite
	0.58	0.81	45	..	622	...	Pearlite
M			90	..	564	...	Troostite

C and Mn contents, is surprising to a high degree. The question as to what extent the somewhat higher silicon and phosphorus content of Steel A (0.26 per cent Si compared to 0.11. and 0.031 per cent P against 0.013 per cent) is responsible for this difference does not come within the scope of the present work. According to the experiments of E. C. Bain, E. S. Davenport and W. S. N. Waring,[6] the conversion speed is also greatly influenced by the inclusions and their distribution.

Steel 231 having 1.10 per cent Mn and 0.31 per cent C is shown in curve 4. At 4 deg. per hr. the A_3 and A_1 points are still shown separated at 682 and 645 deg. At 30 deg. per hr. the time-speed curve barely permits the recognition of the A_3 point, and the pearlite point lies at 597 deg. At 100 deg. per hr. the pearlite point has dropped to 538 deg. and a weak martensite effect is apparent at 233 deg. The strength of the martensite point increases with increasing cooling speed.

Steel 229 having 1.09 per cent Mn and 0.92 per cent C is shown in curve 5. At 4 deg. per hr. there can be observed a pearlite point with strong subsequent heating at 644 deg. At 90 deg. per hr. there appears, besides the pearlite point, which dropped to 496 deg., a martensite point at 192 deg. At 210 deg. per hr. the pearlite point is only indicated slightly, and at higher speeds it is entirely suppressed.

Steel 232 analyzed at 1.52 Mn and 0.38 C. At the very low cooling speed of 4 deg. per hr. the A_3 and A_1 points fall together. From 80 deg. per hr. on there appears besides the greatly lowered A_{321} point a martensite point at 278 deg. At 370 deg. per hr. the martensite point is already greater than the pearlite point, and at 820 deg. per hr. the former point is only weakly indicated on the cooling curve.

Arranged According to the Mn Contents and Cooling Speeds

Designation of Steel	Mn Per Cent	C Per Cent	Speed Deg. C. per Hr.	A_3 Deg. C.	A_1 Deg. C.	Martensite Point	Structure
			210	..	460 s.	193 st.	A little troostite and martensite
			310	..	503 s.	192 st.	
			520	...	428 s.	225 st.	A little troostite and martensite
	0.60	0.89	40	...	...	152	Martensite
A			90	...	...	185	Martensite
			240	...	...	160	Martensite
			Steel With 1 Per Cent Mn				
	1.10	0.31	4	682	645	...	Ferrite and pearlite
231			30	615 s.s.	597	...	Ferrite and troostite
			100	...	538	233 s.s.	Troostite and trace of martensite
Curve 4			220	...	503 st.	308 m.	Troostite and martensite
			320	...	482 m.	319 st.	Troostite and martensite
			780	...	453 s.	347 st.	A little troostite and martensite
			2140	...	...	361	Martensite
	1.09	0.92	4	...	644	...	Pearlite
229			30	...	562	...	Pearlite and troostite
Curve 5			90	...	496 s.	192 m.	Troostite and martensite
			210	...	497 s.s.	190 st.	Trace of troostite and martensite
			350	...	...	160	Martensite
			Steel With 1.5 Per Cent Mn				
	1.52	0.38	4	...	618	...	Ferrite and pearlite
231			30	...	494	...	Troostite
			80	...	444 m.	278 st.	Troostite and much martensite
			220	...	407 s.s.	290 st.	Troostite and much martensite
			370	...	396 s.s.	310 st.	Trace of troostite and martensite
			820	...	400 s.s.	326 st.	Trace of troostite and martensite
			2000	...	...	361 st.	Martensite
	1.48	0.78	4	...	619	...	Pearlite and troostite
			30	...	472	168	Troostite and martensite
230			90	...	...	187	Martensite
			200	...	?	190	Martensite
			290	...	?	196	Martensite

st.—strong
m.—medium
s.—weak
s.s.—very weak

} Comparative estimation of the heat tones shown on the time-temperature curves.

At higher cooling speeds the pearlite conversion disappeared.

Steel 230 had 1.48 per cent Mn and 0.78 per cent C. At 4 deg per hr. a pearlite point with subsequent heating at 619 deg. appeared. At 30 deg. per hr. the pearlite point was very greatly depressed, and next to it appeared a martensite point. For 90 deg. per hour there appears only the martensite point.

Results of Structure Investigation

For suplementing the thermal analyses described above, the structures of the samples were examined microscopically. A few characterizing examples are given in Table 2, and a brief description of the observations is given below.

For steel B containing 0.31 per cent Mn and 0.54 per cent C: At a cooling speed of 40 deg. per hr. free ferrite was observed in addition to pearlite. With increasing cooling speeds a fine structure is attained chiefly in the troostite parts. At 620 deg. per hr. troostite and martensite appear in coincidence with the thermal analysis.

For steel E containing 0.52 per cent Mn and 0.29 per cent C: At cooling speeds of 50 to 90 deg. per hr. ferrite-pearlite mixtures are obtained. At 220 deg. per hr. the portion of the ferrite is only small. The structure obtained at 300 deg. per hr. shows a little martensite as well as troostite. With increasing cooling speeds the amount of martensite increases.

For steel K containing 0.28 per cent Mn and 0.56 per cent C: At 60 deg. per hr. the structure photograph shows small amounts of ferrite in addition to pearlite. At 100 deg. per hr. there is only pearlite and troostite. The appearances of the martensite point at 300 deg per hr. corresponds to a martensite structure development.

For steel H containing 0.59 per cent Mn and 0.74 per cent C: At a cooling speed of 40 deg. per hr. there are still present traces of ferrite in addition to pearlite and troostite. A cooling speed of 80 deg. per hr. produces only troostite and martensite. The troostite structure portion appears with increasing cooling speed behind the martensite.

TABLE 3
Critical Cooling Speeds of Manganese Steels

Designation	Mn Per Cent	C Per Cent	Critical Speed Deg. per Hr. Lower	Upper
B	0.31	0.54	450	900
C	0.31	0.64	450	750
E	0.52	0.29	260	700
K	0.58	0.56	260	600
H	0.59	0.74	180	550
M	0.58	0.81	160	550
A	0.60	0.89	40	40
231	1.10	0.31	150	700
229	1.09	0.92	50	200
232	1.52	0.38	50	300
230	1.48	0.78	20	80

For steel 231 containing 1.10 per cent Mn and 0.31 per cent C: at cooling speeds up to about 100 deg. besides pearlite and troostite, ferrite was also observed. From 100 deg. to about 200 deg. per hr. troostite is found alone, but from 220 deg per hr. and higher there appears besides troostite also some martensite.

Steel 229 containing 1.09 per cent Mn and 0.92 per cent C shows a pearlite-troostite mixture at a cooling speed of 30 deg. per hr. At 90 deg. per hr. there is produced some troostite as well as martensite. At higher speeds the troostite is quickly reduced numerically. The structure of steels containing 1.5 per cent Mn are equal to the series containing 1 per cent Mn.

In summarizing the previous observations, it can be said that the influence of manganese on the critical cooling speed with small additions up to about 0.3 per cent is only relatively small and only at higher contents becomes defined. At contents of 1 per cent and above it is extraordinarily great.

The observed influence of small manganese additions may be a contradiction to experiences in practice, although perhaps at longer glowing periods the influence of the Mn would become more clearly expressed. A testing of this possibility with the thermal process employed herein was impossible for the previously mentioned reasons. On the other hand, reference is here made to the observations of F. Korber and W. Koster[8]. The balling together of the cementite according to this, in the case of Mn steels, was found to be smaller than in the case of unalloyed steels, and from that fact a lowering of the diffusion speed of C in manganese alloyed iron was concluded.

The lower critical speeds, that is those cooling speeds from which a martensite formation was observed, were repeated for the examined Mn steels depending on the carbon content, and the results are shown in curve 6. Using the critical cooling speeds of carbon steels as determined by F. Wever and N. Engel as a basis, manganese additions of 0.3, 0.6, 1 and 1.5 per cent, correspond to reductions of the critical speed to about 4/5, 1/2, 1/5 and 1/10. In view of the small number of measured speed steps these figures are to be considered only approximate, particularly so as the influence of the carbon contents was not taken into consideration.

The upper critical cooling speeds cannot be observed from the thermal experiments with the same surety as the lower ones. It therefore seemed

TABLE 4
Hardening Action of Various Quenching Agents

Designation of Steel	Mn Per Cent	C Per Cent	Water 100 Deg. C.	Rape Oil	Water 18 Deg. C.
			Structure Obtained		
B	0.31	0.54	Ferrite, pearlite with troostite spots	Troostite and martensite	Troostite and martensite
C	0.31	0.64	Ferrite, pearlite and troostite	Troostite and martensite	Martensite and trace of troostite
E	0.52	0.29	Ferrite and troostite	Troostite and martensite	Martensite and trace of troostite
K	0.54	0.56	Pearlite and troostite	Martensite	Martensite and troostite
H	0.59	0.74	Troostite and martensite	Martensite and trace of troostite	Martensite
M	0.58	0.81	Martensite withTroostite residues	Martensite	Martensite
A	0.60	0.89	Troostite and martensite	Martensite	Martensite
231	1.10	0.31	Troostite and martensite	Martensite and troostite residues	Martensite
229	1.09	0.92	Trace of troostite and martensite	Martensite	Martensite
232	1.52	0.38	A little troostite and martensite	Martensite and trace of troostite	Martensite
230	1.48	0.78	Martensite	Martensite	Martensite

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5. Metallurgie, Vol. 3 (1906), page 271.
6. Am. Inst. Min. Met. Engs. Techn. Publ. No. 467, Cl. C., Iron Steel Div. No. 87 (1932).
7. Trans. Am. Inst. Min. Met. Engs., Iron Steel Div. 100 (1932), pgs. 13 to 46.
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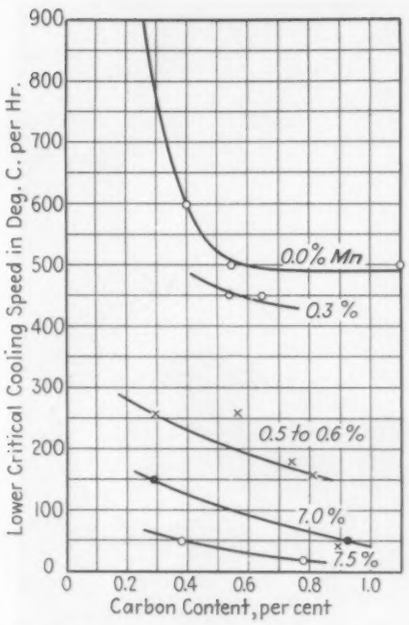
9. The designation A_3 and A_1 point is only to designate the beginning and end of the decomposition of the solid solution austenite; seriously taken the use of it is not permissible in the multi-material systems as the designation is taken from the iron-carbon system.

desirable to determine the upper critical at least according to their order of magnitude by another process. For this purpose samples of 30 mm. length and 3 mm. diameter were heated in a current of hydrogen to a hardness temperature, quenched in various liquids, and subsequently examined for their structure conditions. The danger of decarbonization at this diameter is small for the core, and possible differences between the rim and core are easily observed in the transverse cutting of the grain. The hardening agents used were, according to their quenching value,[4] water at 100 deg., rape oil and water at 18 deg. The compilation in Table 4 shows that the lower eutectoid steels containing 0.3 per cent Mn are not hardened by water at 100 deg., by rape oil only partially, and only to a considerable extent by water at 18 deg. In the series containing 0.6 per cent Mn the hardening ability increases with increasing carbon content. Water at 100 deg. in the case of 0.29 per cent C does not cause hardening, and for 0.89 per cent C steel the hardening is also not complete. Rape oil hardens all the steels examined with the exception of steel E which contains 0.29 per cent C, whereas all the steels are completely hardened with water at 18 deg. Of the steels containing 1 and 1.5 per cent Mn, the two containing 0.31 and 0.38 per cent C upon quenching in boiling water had structures composed of martensite and troostite, and also upon quenching in rape oil there were troostite residues. Of the two higher carbonized steels, No. 229 containing 1.09 per cent Mn and 0.92 per cent C, after quenching in water of 100 deg. the structure is martensitic with traces of troostite. Upon quenching in water at 18 deg. all four steels containing 1 and 1.5 per cent Mn become martensitic.

According to these experiments the upper critical speeds can be about estimated, although too great exactness must not be attributed to the values in the last column of Table 3. On the whole, the reduction of the upper critical speed by an Mn addition runs parallel to the lowering of the critical speeds.

A middle conversion appearing between the pearlite point and the martensite point, as in the case of chromium[3], was not observed in the case of the Mn addition. Moreover, the pearlite points drop continuously with increasing cooling speed and without doubling. A reduction of the martensite formation speed or even a suppression of the martensite formation, as is known in the case of steels with higher Mn content, was not observed



Curve 6—Curves of the lower critical cooling speeds showing the influence of manganese and carbon contents of the steel.

in the present experiments. The temperatures of the martensite formation lie somewhat lower than in the case of pure carbon steels with corresponding carbon contents.

The structure examination confirmed the results of the thermal analyses. The pearlite appearing at low cooling speeds becomes markedly finer with increasing cooling speed and finally passes into dark, etched troostite. The appearance of the martensite point upon the thermal cooling curves corresponds in the structure photograph to the martensite structure, whereby the intensities of the thermal effects are somewhat relatively equal to the numerical parts of martensite.

In summarizing, the influence of the Mn upon the conversion of the carbon steels was examined in a series of steels with carbon contents up to 1.5 per cent.

The pearlite temperature is noticeably reduced by Mn additions as well as by an increase of the cooling speed.

The speed of the pearlite formation is reduced by a Mn addition, and correspondingly the pearlite formation even at small cooling speeds is depressed. The martensite formation, in the case of unalloyed steels which were tested, sets in with higher speed and it is also not depressed at higher cooling speeds. A middle conversion step as in the case of chrome steels was not found.

The critical cooling speeds of carbon steels are depressed about 80 per cent by additions of Mn around 1 per cent. A structure examination confirms the results of the thermal analysis.

George P. Thomas Sees Diminishing Russian Market

JUST recently, through the Russian-American Chamber of Commerce in New York, I visited Russia and Siberia with a group, inspecting steel mills and industrial plants and also to look over some installations of machinery that my company has furnished. Besides looking over various plants in Moscow, the most interesting places visited were the steel mills at Magnitogorsk in the Ural mountains; the tractor plant at Chelyabinsk; the large foundries and machine shops at Sverdlovsk (formerly Ekaterinburg) and mills at Novo Kuznetsk near the border of outer Mongolia directly across the pole from Chicago.

At Magnitogorsk (which means Magnetic Mountain) are four modern blast furnaces with byproduct coke ovens, open hearth furnaces, and blooming mills in operation. Structural mills are in process of installation.

Fire clay and limestone are obtained locally, but coal must travel about 1000 miles.

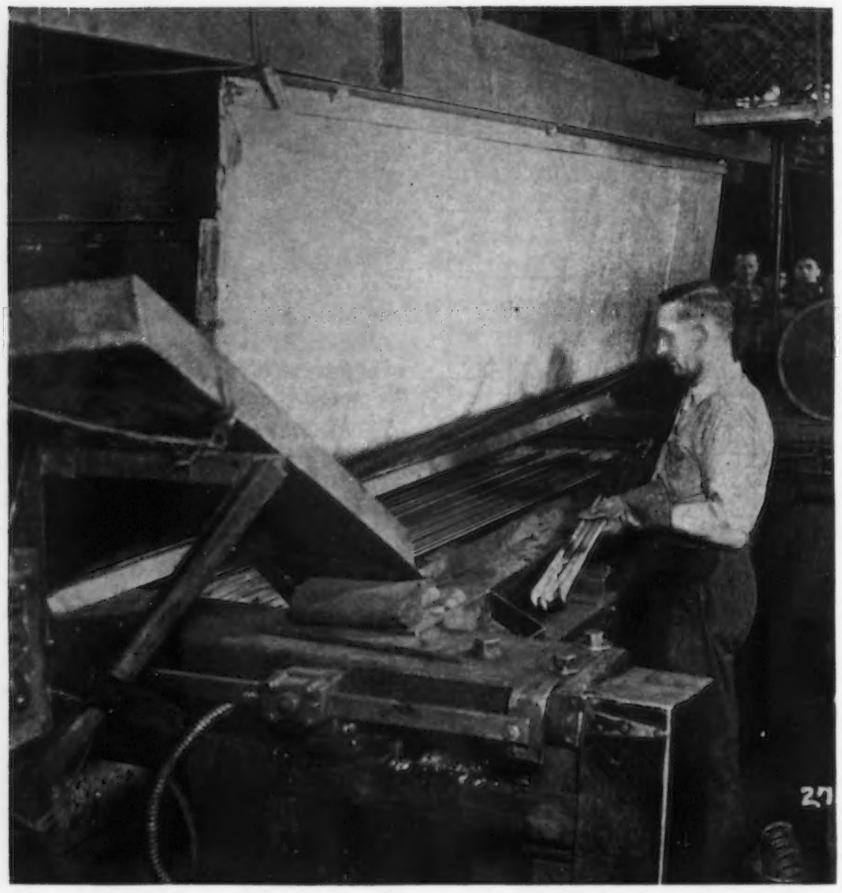
At Chelyabinsk is a large modern tractor plant with iron and steel foundries, forge shop and machine shop with the latest type of equipment. Machine tools in this plant are mostly German and English, with a sprinkling of American tools.

At Sverdlovsk are located large iron and steel foundries and a modern machine shop about 450 ft. wide and 1500 ft. long, filled with the latest tools to take care of the heaviest classes of work.

Sverdlovsk is located on the eastern side of the Ural mountains, in very attractive country with lakes and forests and a fine agricultural region.

At Novo Kuznetsk (recently rechristened Stalinsk) are three blast furnaces 1200 tons capacity each, and one under construction. Coke ovens, open hearth furnaces, blooming mills and a rail mill are in full operation. This rail mill is a duplicate of Bethlehem's Lackawanna mill, we were told.

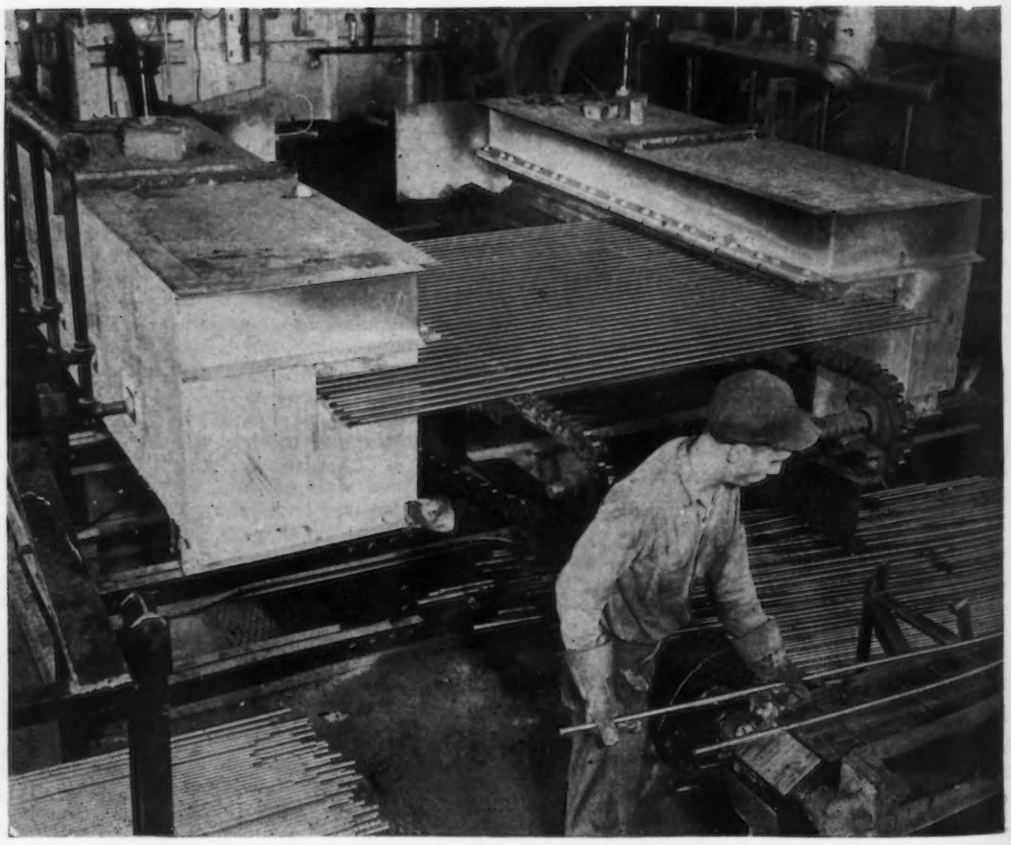
(Concluded on page 73)



Gas Heating i

SUPPLEMENTING the extended description in THE IRON AGE of March 1 of the methods of making knee-action units developed by the Chevrolet Motor Co., particulars of the furnace equipment used in that manufacturing achievement have been received from J. B. Nealey, of the American Gas Association. The story of the manufacture of the units is one of reaching orderly production at a high rate in a short time and involving practices new to the industry. Besides the coiled springs, the problems included difficult steel extruding operations and a new application of roller burnishing. The accompanying illustrations will serve

After being pointed on both ends, the spring steel bars are loaded into the furnace for heating to 1600 deg. F. preparatory to coiling. This is a pusher-type furnace, and the bars ride on short lengths of tubing, which are ejected at the discharge end and returned to the loading end by a conveyor delivering through the chute shown at the left.



Steel spring bars, cut to 93½ in. in length, arrive from the centerless grinders on the slat conveyor shown in the foreground and are transferred to the parallel chain conveyor by which they are carried, properly spaced, through the twin gas furnaces which heat the ends of the bars for pointing.

ting in Making Chevrolet Knee-Action Springs

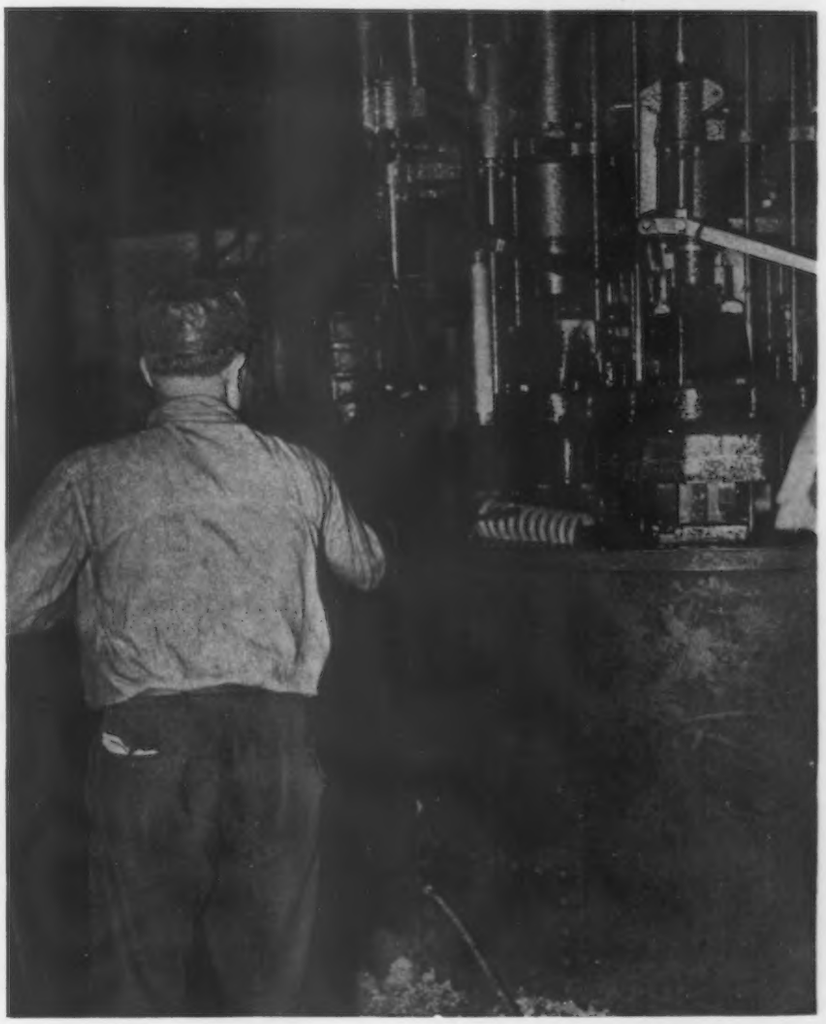
to indicate the role of the gas-fired furnaces in the factory equipment, which was installed at the Chevrolet spring and axle plant in Detroit.

The springs are coiled hot from bars cut into 93½ in. lengths. The rods are first given a single pass through a centerless grinder of which there are nine in a row. This reduces them to 0.6875 in. in diameter. On one side of this row is a narrow slat type conveyor to carry the rods from the grinders to the point roll furnace. The rod ends are then heated for pointing or tapering, so they will be flat against the coil, in a pair of slot type forging furnaces, facing each other with a moving chain conveyor between, consisting of two chain loops. The distance between these twin furnaces is just enough to allow the proper amount of the ends of the rods to travel along in the hot zones. Each furnace is 30 in. wide and 8½ ft. long, stands on 2-ft. legs, and is heated with four gas burners located in the rear wall. The conveyor is timed so that the rod ends are in the furnaces but six min., where they acquire a temperature of 1800 deg. F. This unit heats the material fast enough to keep three point rollers working.

Three operators handle the pointing operation and then place the pointed rods directly upon a 4-ft. charging table of a pusher type furnace, where they are heated for coiling. This brick and refractory furnace is 15 ft. long and 13 ft. wide. On the hearth four U-shaped rails are laid lengthwise and tubes 5 in. long are put in these end to end, for the rods to ride on. The tubes are returned to the charging end of the furnace in a V-shaped conveyor with a moving chain conveyor in the bottom of it.

Heat is supplied by eight gas burners, four to a side, so arranged that half underfire and half overfire the work. The rods are heated to 1600 deg. F. As they are withdrawn from the furnace the red-hot rods are fed directly to the coiling machines, arranged in a battery of four units.

The coils are then heated for hardening and drawn. The hardening furnace is 27 ft. long, 9½ ft. wide and 6 ft. high, and is of the conventional brick and steel construction. It is equipped with an apron type conveyor, motor driven through a ratchet and pawl, and a variable speed mechanism. The hot springs lie in individual cradles in the conveyor and roll out through a small opening in the discharge end of the furnace. Heat is supplied through several gas burners located

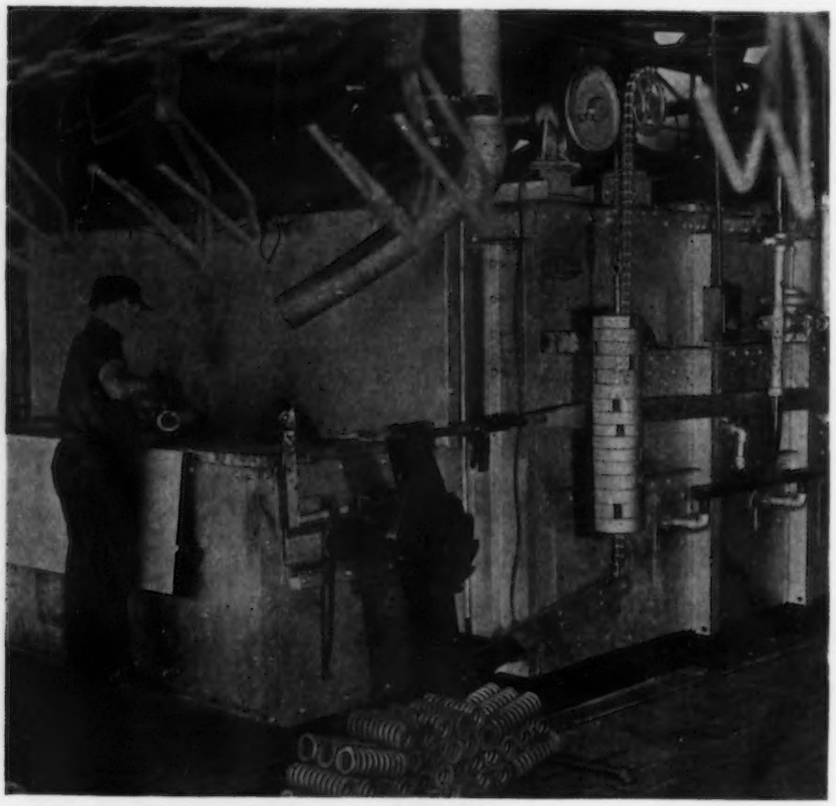


After the first heat treatment, springs are loaded into a quenching machine. The spring is clamped firmly to maintain its proper length, diameter and shape before the descending fixture immerses it in oil.

▲ ▲ ▲

in the sides of the furnace and the work is discharged at 1600 deg. F.

The gas burners in the various furnaces are of the inspirator type, air at 1½ lb. pressure being employed to draw in the gas at 6-in. water pressure. The automatic temperature controls of all of the furnaces are located in a central control room, the air lines of the respective furnaces being piped through this room for that purpose. Here a motor operated valve is cut into each line and the fuel flow to the burners is increased or decreased in response to a thermocouple and potentiometer controller. The point is only the air flow need be regulated with the inspirator type burner. A recording pyrometer charts the temperature fluctuations. It is claimed that this method, with a metallurgist in constant attendance, affords closer control than when the control equipment is located at the furnaces.



The hardening furnace is equipped with an apron type conveyor, motor driven through a ratchet and pawl, and the springs lie in individual cradles in the conveyor.

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Quenching is accomplished in two circular steel tanks and each tank is provided with a revolving vertical shaft holding four sets of fixtures and dies in which the springs are clamped to prevent them from warping. These have hydraulic cylinders attached and submerge the fixtures progressively as soon as springs are placed in them. They are moved about the tank intermittently and this indexing, also the submerging and return, opening and closing of the dies, etc., are all done automatically. Oil is used for quenching and this is kept at 110 deg. F. by recirculating it through an underground tank with water coils for cooling, the water in turn being cooled in a tower outside. The springs are in the quench 1¼ min. Oil is released under pressure in the interior of the coil, thus quenching it from the inside out.

The draw furnace is built overhead, supported by a steel frame structure, and the springs are transferred to it from the quench on a moving chain conveyor. This furnace is 30 ft. long, 12 ft. wide and 6 ft. high, and following recent practice for low and medium temperature furnaces, the heat is derived from a separate, gas-fired heater. This is of the conventional barrel type with two gas burners in one end and a fan in the other, recirculating the heat throughout the oven by means of a double system of ducts. The conveyor passes into the oven where it makes five passes and, as it comes out the other end, dips so as to plunge the coils in water to cool for handling. The work is drawn at 980 deg. F. for one hour. The coils are suspended from fixtures fastened to the conveyor chain, eight to a fixture.

Girdler to Address A.S.M. Banquet

THE annual banquet of the American Society for Metals, to be held in Hotel Pennsylvania, on Thursday evening, Oct. 4, will be one of the outstanding banquets yet held by the society. Several important events on the banquet program are expected to bring out the largest attendance in history.

The principal address of the evening will be delivered by Tom M. Girdler, chairman of the board of Republic Steel Corpn. Those who have had the opportunity to hear Mr. Girdler know that he is an interesting, intelligent and thoughtful speaker. He will bring to the banqueters an attractive message.

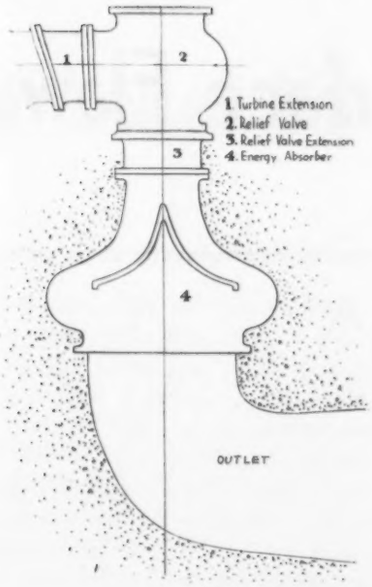
Another outstanding event of the banquet is that it will be in the nature of a testimonial dinner to Doctor Albert Sauveur, Harvard University, honorary member of the A. S. M., and in whose honor and in recognition of whose outstanding activities and contributions to metallurgy the society has established the Albert Sauveur Achievement Medal. Doctor Sarveur will receive the first award of the medal, which has been created by the Board of Trustees in recognition of his pioneering work and activity in the metal industry.

The Henry Marion Howe Medal and the President's Medal will also be awarded at the banquet.

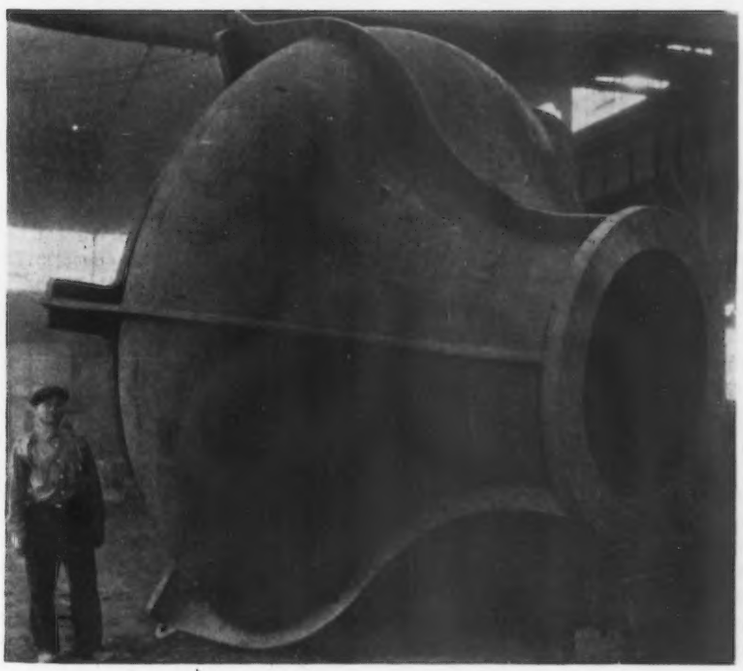
Reservations should be forwarded to A. S. M. headquarters either in Cleveland, or at Hotel Pennsylvania, New York, or tickets may be purchased at the registration desk during the Congress and Exposition.

The tables seat eight; the price of the banquet will be $4.00 per ticket.

The important beryllium business in Germany, formerly conducted by Siemens & Halske A. G., outstanding world pioneers in beryllium investigation and utilization, was taken over a short time ago by the Heraeus Vacuum-Schmelze A. G. of Hanau. All the work in the field of beryllium hitherto done by the Siemens concern, including production and sales of the pure metal as well as the alloys, and also all research work, will now be carried on from Hanau.



Mammoth Steel Castings For Boulder Dam Turbine



EACH of Boulder Dam's 17 turbines requires a discharge system as shown sketched at the upper left. A solid column of water passes from the turbine through the piston-operated relief valve and thence through the energy absorber which breaks its force and passes it into the discharge tunnel in a comparatively thin stream. The energy absorber and extension will be embedded in solid concrete.

These large steel castings for the discharge system are now being cast by the Machined Steel Castings Co., Alliance, Ohio. On top of the relief valve will be mounted the 18,600-lb. cylinder head which will support the operating mechanism. This head is shown above. At the center left is the 20,640-lb. relief valve piston which will be hydraulically operated within the relief valve to govern the flow of water. The heaviest casting in the system is the 55,700-lb. energy absorber at the lower left. In molding this absorber, 41 cores were used and the outside of the mold consisted of a drag, two cheeks and a cope. The metal was poured through three gates at three levels in the mold.

All of these castings are made of grade B medium A.S.T.M. 2724 steel which on test shows no sign of surface fracture when a 1-in. bar is bent cold completely around a 1-in. pin. The completed system was subjected to a 500 lb. per sq. in. water pressure test.

Origin of Surface Flaws

Fig. 1—Sheet with a blistered surface.

Fig. 2—Torn surface ascribed to inclusions of refractory material.

Fig. 3—Sheet with flash figures.

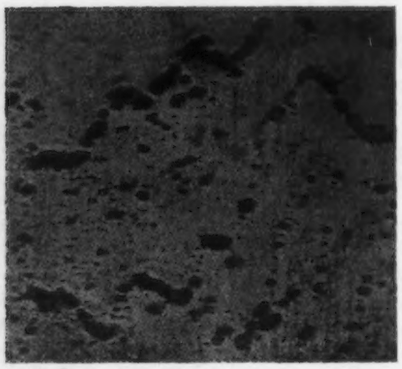


Fig. 4—Sheet surface with clouds which are caused by non-metallic inclusions.

ABOUT fifteen years ago the average steel sheet was so full of scars and other surface flaws that a number of additional working processes were necessary before it could be used satisfactorily for articles requiring a high finish. However, within recent years the industry has so refined its rolling technique that most faults have been eliminated or at least considerably reduced in fre-

IN comparison with the steel sheets of past years which had many surface defects, the first quality sheets of today have a great capability of deep drawing as well as almost perfect surfaces capable of being spray lacquered to a high finish. In general the sheets of the present time are usually almost entirely free of uneveness and faults, at least on one side. For the production of such high quality products there must be observed the greatest cleanliness starting with the initial slab or billet on up to the finished sheet. The more high grade the surface that is desired the more care must be employed during the production of the sheet.

Many faults extend over the entire surface of both sides, whereas there are others which are visible only on one side or appear only in individual places. Some surface blemishes originate in the open-hearth and others can be blamed on delinquencies in rolling mill practices.

A sheet with blisters, which appear as surface elevations in the form of nests or lines, can be seen in Fig. 1. Part of the ingot or the billet itself was rolled at an unsuitable temperature, and the rolling process did not fully weld out all of the gas bubbles. In addition, foreign substances such as dirt in the ladle or molds as well as products of slag forming reactions that occur during the deoxidation of the metal are both original sources of blisters in finished products. "Blister sheets" can often be recognized after hot rolling, and they are still easier to detect after the pickling and annealing processes. These types of sheets are practically always rejected.

Surface blemishes, which are attributed to non-metallic inclusions, can be seen in Figs. 2 to 5. They originate either from deoxidation products or residues of refractory materials which have come into contact with the steel during pouring or during the heating of the billet. Sometimes the surfaces of such sheets appear torn as in Fig. 2. Another blemish, as in Fig. 3, is designated as "flash figures," and it can be almost exclusively ascribed to deoxidation products. The "clouds," which appear in Fig. 4, also arise from residues of refractory material and, in general, they form noticeable elevations in the sheets toward both sides, thereby giving the surface a spotted appearance. Dark metallic, shining places lie next to dull ones. The shining places are the elevations in the sheet and they have a somewhat greater thickness than the dull places, as can be determined from microscopic measurements. In the cross-grain within such bright places greater slag inclusions are visible, as shown in Fig. 5. If a sheet strip with such thick superimposed places is bent back and forth then the sheet crackles and a gray-white powder drops out which can be determined as a residue of the deoxidation.

On rolling out thin sheets which have been doubled several times, the inclusions present in a sheet press into the sheets of the package lying above and below and leave impressions in the sound sheets. Thus, for instance, Fig. 6 shows an impression of the clouds shown in Fig. 4. If such sheets are cold rolled and annealed then the surface of the sheet is smoothed somewhat and it is difficult to distinguish between "original" and "impression" blemishes. Sheets with a considerable number of non-metallic inclusions produce fracture impressions during treatment and are very undesirable for fabrication into products which are

# of Steel Sheets

By EMMY MARKE

quency. This abstract reviews the origination as well as the procedures for avoiding the more common surface blemishes of sheet steel. The original manuscript was presented by Mr. Marke in Germany before the Sub-Committee for Sheet Metals, Verein Deutscher Eisenhüttenleute, and was reported in detail in a recent issue of Stahl und Eisen.

to be tinned, electroplated or lacquered to a high polish.

Seams and cracks in ingots and seams in billets produce cracks and scars on the surface of the finished sheets. Therefore, ingots and billets should be examined for quality and be polished in order not to transfer the faults of the semi-finished materials to the finished materials. Many surface blemishes are caused by the working method in hot rolling mills and in the subsequent side operations. Therefore, the billets before they get into the sheet rolling mill should be examined for rough and scary surfaces and those particularly bad should be discarded. From the beginning all operations should work toward a perfect crude sheet, for surface faults which are caused in hot rolling cannot be made good.

Special care is required in heating the billets. It must take place uniformly. On the other hand care must be taken that a reducing atmosphere prevails in the heating furnace and the temperature is not too high for otherwise a scaling or piping of the billets would set in. In order to avoid the entrance of air as much as possible, the doors of the heating furnaces should operate well and easily. On pulling the billets from the furnace care must be taken not to scrape the bottom. Prior to rolling, the loosely adhering piping can be brushed off with a wet broom. As in the case of the billets, the plate or the pre-rolled sheets should be carefully warmed in a reducing atmosphere. As the heating temperatures of the plates lie lower than that of the billets they can be warmed uniformly without much piping.

A continuous feeding of the sheets during rolling is indispensable. If care is not taken the scale or piping rolls deep into the sheet and after pickling defects appear in the form of scars and holes, as shown in Fig. 7. For this reason roller tables must be kept clean by frequently brushing them free of dust and small particles of scale. The billows often observed, as in Fig. 8, are faults of rolling mills, especially in the case of thin sheets. Their origination depends upon the linear speed of the surfaces of the rolls, as well as the roll pressure or the calibration of the rolls. These factors, together or individually, give the sheets no time to flow. The individual small work particles slip one over the other and form elevations in easily arched form which then later are not uniformly gripped by the cold rolls. Therefore the billows are best recognized after the cold rolling procedure as bright and dull places. The billows represented in Fig. 8 contain no inclusions as the clouds represented in Fig. 4. However, they cause very similar blemishes in adjoining bars and in the rolls.

Another surface blemish which appears after hot rolling appears in the form of greatly sticking sheets. The sticking, which always gives a rough surface, can also be connected with the grinding of the rolls and the specific rolling pressure. The working procedure in the hot mill requires a frequent grinding of the rolls. If thereby grinding cracks are formed then these press into the sheet and the resulting surface appears covered with numerous parallel cracks, as in Fig. 9. If the sheets cut each other during rolling then long lines appear on them, as represented in Fig. 10. Other faults which occur in the hot rolling department come from a rolling in of small slag particles, grease or dust.

Following the rolling, the sheets

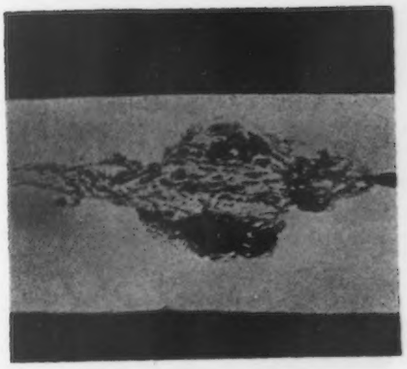


Fig. 5—Inclusions within the clouds shown in Fig. 4.

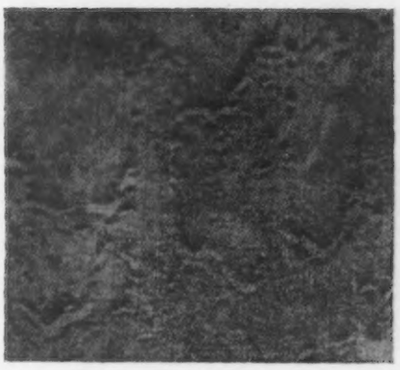


Fig. 6—Impression in one sheet of clouds in another sheet with which it was rolled.

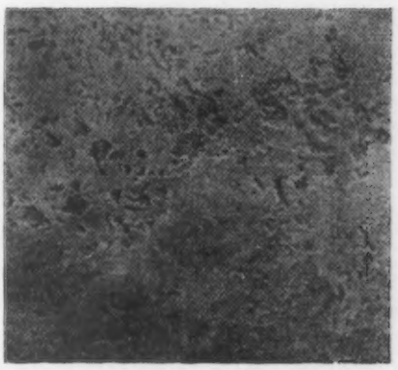


Fig. 7—Sheet surface with pickling scars.

Fig. 8—Sheet surface with billows.

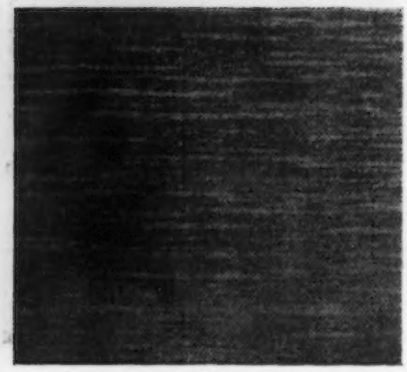


Fig. 9—Sheet surface with grinding fissures.

are cut or sheared. This procedure likewise must be carried out with care, as a cutting bur can at times entirely or partially scratch the surfaces of many sheets. In addition, during the annealing process, the sheets should be so treated that the structure of the finished product shows a small and uniform grain. If the grain is coarse then the surface of the sheet during working conditions is rough and cannot be used for quality parts.

In Germany steel sheets are divided in about four rough classes according to the surface finish. Quality sheets are always pickled, the number of picklings determining the quality. About the poorest grade of sheet is pickled only once. After finishing, the surface must be free of piping; that is, during bending no piping must spring off. Small scars are permissable, and the surface can be moderately rough. These types of sheets are used for simple drawn parts which are enameled, or such drawn parts in which the user expressly prescribes a not smoothed surface "in order that color and lacquer can adhere well."

Sheets in the second group are pickled twice. The first pickling is performed on the semi-finished steel and the final pickling takes place generally after annealing. Such sheets in this class are free of surface scars, and they are used for drawn parts which require a good surface.

Sheets in the third group must have surfaces capable of taking the best of spray lacquered surface. The sheets must be free of pores, all blemishes, and must be smooth. During the production of this type of sheets the greatest care is taken to procure clean billets, to carefully heat the material during rolling, and to exercise caution during pickling, cold rolling, annealing, polishing and drying. Sheets of this type are used in the construction of trucks, steel furniture, utensils, etc.

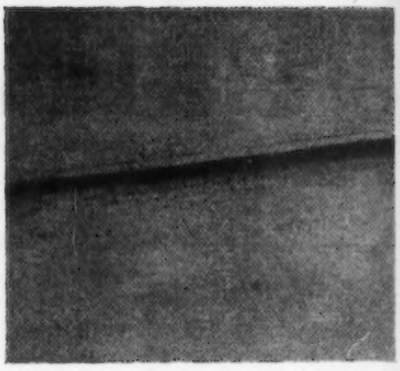


Fig. 10—Cuts on the surface of a sheet caused by over-rolling.

In the fourth group are classed sheets which are used in the fabrication of trucks, automobiles, steel furniture, illuminating bodies, tools, etc. The surfaces must be very smooth and free from all blemishes. During the fabrication process, the sheets must not warp, buckle or throw. After the last annealing the sheets are usually stretcher leveled.

August Steel Ingot Production Was Lowest Since April, 1933

AUGUST production of steel ingots was 1,363,359 tons, according to the American Iron and Steel Institute, compared with 1,472,584 tons in July, and with 2,863,569 tons in August, 1933. Output last month was the lowest since April, 1933, when 1,345,422 tons was produced. With 27 working days in the month, the August daily rate of production was only 50,495 tons, compared with 58,903 tons in July, and with 106,058 tons in August of last year.

The industry's potential capacity was engaged at 22.93 per cent in August, against 26.75 in the preceding month, and with 48.79 per cent in the corresponding month last year.

Steel production in the first eight months of 1934 was 19,016,832 tons, compared with 14,906,311 tons in the corresponding 1933 period.

MONTHLY PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS

(Gross Tons)

Reported for 1933 by Companies Which Made 97.82 Per Cent of 1933 Ingot Output

1933	Open-Hearth	Bessemer	Calculated Output All Companies: Monthly	Calculated Output All Companies: Daily	No. of Working Days	Per Cent Operation‡
January	885,663*	109,000	1,016,870†	39,110†	26	17.99†
February	922,798*	126,781	1,073,012†	44,709†	24	20.57†
March	784,111*	94,509	898,236†	33,268†	27	15.30†
April	1,180,823*	135,217	1,345,422†	53,817†	25	24.76†
May	1,716,425*	216,841	1,976,428†	73,201†	27	33.68†
June	2,211,652*	296,765	2,564,420†	98,632†	26	45.37†
July	2,743,326*	355,836	3,168,354†	126,734†	25	58.30†
August	2,430,663*	370,370	2,863,569†	106,058†	27	48.79†
Eight Months	12,875,461	1,705,319	14,906,311	72,011	207	33.13
September	1,991,204*	242,014	2,283,079†	87,811†	26	40.40†
October	1,847,690*	191,673	2,084,894†	80,188†	26	36.89†
November	1,331,029*	156,939	1,521,189†	58,507†	26	26.92†
December	1,629,495*	129,834*	1,798,606†	71,944†	25	33.10†
Total	19,674,879*	2,425,779*	22,594,079†	72,884†	310	33.53†

* Revised. † Adjusted.

‡ The figures of "per cent of operation" are based on the annual capacity as of Dec. 31, 1932, of 67,386,130 gross tons for open-hearth and Bessemer steel ingots.

Reported for 1934 by Companies Which Made 99.39 Per Cent of Ingot Production in 1933

1934						
January	1,786,467	172,489	1,970,979*	72,999*	27	33.15*
February	1,993,638	175,873	2,182,826*	90,951*	24	41.31*
March	2,540,143	203,904	2,760,888*	102,255*	27	46.44*
April	2,622,372	257,482	2,897,529*	115,901*	25	52.64*
May	3,000,624	331,620	3,352,695*	124,174*	27	56.39*
June	2,714,983	282,592	3,015,972	115,999	26	52.68
July	1,343,732	119,869	1,472,584	58,903	25	26.75
August	1,245,445	109,598	1,363,359	50,495	27	22.93
Eight Months	17,547,404	1,653,427	19,016,832	91,427	208	41.52

* Revised.

‡ The figures of "per cent of operation" are based on the annual capacity as of Dec. 31, 1933, of 68,478,813 gross tons for open-hearth and Bessemer steel ingots.

New Things in Materials and Processes

By EDWIN F. CONE

Metals and Solar Energy

A SIGNIFICANT hint that metals may play an important role in the conversion of the sun's heat into mechanical energy is found in the recent statement that surfaces of copper oxide are already available, which, when exposed in broad daylight, convert a small but measurable part of the solar energy that falls upon them into electricity.

Many times the suggestion has been made that a way may sometime be found to make available to humanity the tremendous energy constantly being given off by the sun. Dr. Colin G. Fink, of Columbia University, has recently said that the day has already come for students in technical schools to specialize in solar engineering—the conversion of the sun's radiation into mechanical energy.

The employment of metals or alloys, whether in conjunction with photoelectricity or not, may prove to be the way.

• • •

World's Largest Anchors and Chains

PROBABLY the largest steel anchors ever cast have been made recently in England. They are for the new gigantic Cunard-White Star Liner No. 534. The steel founder's art is still in demand for products of this nature. Three anchors have been cast, two weighing 16 tons each, and the third, a spare, 12 tons in weight. It is said that the largest of these is capable of bearing a load of 694 tons and the two large ones are claimed to be sufficient to hold the vessel against the strongest gale without any assistance from the engines.

The port and starboard anchors—the 16-ton ones—will each have 990 ft. of chain cable attached to them. Each link of the 90-ft. lengths of the cables is 2 ft. long and 4⅛ in. in diameter. The steel incorporated is acid open-hearth of high quality. The steel is so tough the material can be bent double without indications of fracture. The 90-ft. cables are shackled together so that, in the rare event of one being broken or carried away, the broken length can easily be removed for repairing.

The method of welding the links is of interest. The links are forged in two pieces, and after they are threaded together, they are put through an electric welding machine which joins the pieces. The success of this welding is demonstrated by the fact that when the links are tested to destruction they fracture in the solid metal and not at the welded joint.

The 15-fathom lengths are tested to a breaking strain of 405 tons. When three-link pieces are tested to destruction, it requires a load of over 694 tons to bring fracture.

• • •

Zinc-Coated Wire by a New Process

A SPECIAL galvanized wire recently brought out by one of our leading steel companies is made by an entirely new process.

Instead of the hot dip process with molten zinc, the zinc is deposited on the wire by an electrolytic process. Metallic zinc is not directly used but a zinc-bearing ore is employed; the zinc in the ore is brought into a solution which is electrolyzed in the presence of the wire.

A highly adherent coating of zinc is found to be the result, one that will assure the bending of the wire without cracking or chipping off of the zinc. Stress is also laid on the beautiful surface obtained as well as the possibility of realizing any depth of zinc covering desired.

• • •

German Low-Alloy, High-Strength Steel

A LOW-ALLOY, high-strength steel reported to find favor in Germany is one containing about 0.50 per cent copper and 0.60 per cent chromium, with a low-carbon content. This steel is said to possess a tensile strength of 75,000 to 100,000 lb. per sq. in. with a yield point of about 55,000 lb. and good ductility, and to have excellent welding and fatigue qualities.

A steel of similar composition is not generally exploited in this country. But there are plenty—perhaps too many—steels in the low-alloy, high-tensile classification in the American market. A survey of the situation reveals about 12 such steels made by American companies with others being investigated for introduction to the American market. Competition in this field is sure to be lively.

• • •

Long Brass Cylinders Cast Centrifugally

SOME rather striking results are being regularly achieved in the centrifugal casting of large cylindrical shapes of brass or bronze. In the brass foundry of one of our steel companies such cylinders are made up to 288 in. or 24 ft. in length, and from 6 to 48 in. in outside diameter.

These castings are found to have a fine, close-grained, dense structure, free from segregation and porosity. Not only brass and bronze can be thus cast but also special alloys of acid-resisting and non-corroding compositions.

Representative applications of these products include ship construction, paper and pulp mill machinery, chemical plant equipment, textile machinery, hydraulic equipment, pump and press liners, pneumatic tubes, driers, mining machinery, and coke work equipment.

• • •

Steel Sheets Coated With Aluminum

IT has long been the dream of workers in the field of plating or coating of metals that steel, so coated with aluminum, would possess many advantages. The replacement of tinned plate with aluminum coated steel looks attractive in many quarters from the point of cheapness of aluminum as compared with tin.

Two processes for coating steel sheets with aluminum are now being investigated, and at least one of them is nearing the successful commercial stage. One is an electrolytic process and the other is a hot-dip process.

One company announces that it has "succeeded in electroplating aluminum on tin mill black iron sheets of commercial size." Plating with an aluminum alloy is also claimed. The process is claimed to affect in no way the properties of the metal. The aluminum plated sheets are announced as standing up well when subjected to tests and also to work perfectly on the standard can-making

machinery; and the soldering of such cans is reported to be successful.

The hot-dip method of coating the sheets with aluminum appears to be similar to that used in producing tin plate. Tests are said to reveal that the new product is more resistant to fruit and vegetable acids than is tin plate. Its appearance also is termed as all that can be desired.

• • •

New Type of Induction Furnace in Europe

INFORMATION from an authentic source is to the effect that in Germany and Sweden a new type of electric induction melting furnace has appeared. Low-frequency current is employed for melting down and high-frequency for finishing the heat. It is stated that the melting down is quicker than when only high-frequency current is used and at a less cost and that the use of high-frequency heat to complete the heat is just as efficient and advantageous. Such furnaces are said to be operating in Europe.

• • •

Aluminum Stars for Additions to Steel

STAR-SHAPED pieces of aluminum are suggested for adding this metal to steel both for deoxidizing and alloying purposes. This method is expected to be quicker for melting the aluminum than the present use of square pieces of the solid ingot metal. More economy is thought likely to result, partly because of the larger area exposed by the star-formed piece. The new shape also makes easier of application the conventional method of affixing the aluminum pieces to the stirring rod.

• • •

A Machine for Rust-Proofing

A RUST-PROOFING machine has been perfected by a Detroit company which expedites the treatment of many small odd-shaped pieces required for a wide variety of purposes. A feature is that it can be attached without trouble to the apparatus which cleans the material prior to the rust-proofing.

Open-meshed baskets convey the material on a loading table to the treating chamber. The table is part of the machine. By hand each basket is pushed into the cabinet and the depressing of a hand lever closes the doors. Automatically there is started the flow of rust-proofing fluid which is atomized by compressed air. When the pieces have been covered with the rustproof film, pushing of the lever shuts off the atomizer and opens the delivery and discharge gates at the same time.

Iron and Steel Products Made

Steel-works and Rolling-mill Products by Class, Kind, Quantity, and Value: 1933 and 1931

(The term "interplant transfers" refers to transfers of the products of one plant for use as materials in another plant operated under the same ownership.)

Class and Kind	1933 Gross Tons	1933 Value	1931 Gross Tons	1931 Value
Steel-works and rolling-mill products, aggregate mill products, aggregate value	.....	[1]$1,141,017,798	.....	$1,399,488,877
Unrolled steel, total	23,159,749	.....	25,895,640	.....
Open-hearth:				
Basic	20,033,695	.....	22,131,176	.....
Acid	301,125	.....	387,032	.....
Bessemer	2,428,585	.....	3,018,938	.....
Electric or electrically refined and crucible	396,344	.....	358,494	.....
Ingots:				
For sale	27,283	1,058,095	50,680	1,687,923
Interplant transfers	105,520	2,873,834	192,660	3,860,568
Produced and consumed in same works	22,751,138	.....	25,192,999	.....
Direct steel castings:				
For sale	[1]208,172	[1]30,630,360	352,437	57,153,225
Interplant transfers	11,196	1,421,384	18,116	2,403,456
Produced and consumed in same works	[1]56,440	.....	88,748	.....
Semifinished rolled products:				
For sale and for interplant transfer, total	5,470,287	137,957,031	5,632,754	161,672,575
Blooms, billets, and slabs steel (except for forging)[2]				
For sale	1,485,563	40,269,687	871,887	27,545,558
Interplant transfers	1,539,326	39,229,254	2,235,427	63,564,140
Produced and consumed in same works	13,525,110	.....	15,616,861	.....
Rolled blooms and billets for forging—				
For sale and for interplant transfer	64,138	2,008,338	69,398	2,494,278
Produced and consumed in same works	57,057	.....	103,548	.....
Sheet and tin-plate bars—				
For sale	1,677,654	40,284,633	1,791,833	51,548,862
Interplant transfers	691,632	15,741,738	647,265	15,741,618
Produced and consumed in some works	2,417,798	.....	2,125,817	.....
Muck and scrap bar—				
For sale and for interplant transfer	11,974	423,381	16,944	778,110
Produced and consumed in same works	73,691	.....	105,607	.....
Finished rolled products and forgings, total[3]	16,160,567	.....	18,396,161	.....
For sale	9,947,844	447,985,367	11,899,187	563,647,141
Interplant transfers	1,218,382	47,558,768	1,298,423	51,252,126
Produced and consumed in same works	4,994,341	.....	5,198,551	.....
Rails:				
For sale and for interplant transfer	393,144	15,157,302	1,130,069	48,196,793
Produced and consumed in same works	4,364	.....	11,425	.....
Rerolled or renewed rails, not including rails rerolled by makers of ingots from new seconds, for sale	18,267	537,065	(4)	(4)
Rail joints and fastenings, tie-plates, etc., for sale and for interplant transfer	197,713	9,316,031	379,288	19,095,588
Structural shapes (not assembled or fabricated):				
Heavy (leg or web 3				

in 1933 Valued by Census Bureau at $1,141,000,000

Class and Kind	1933 Gross Tons	1933 Value	1931 Gross Tons	1931 Value
in. and over), for sale and for interplant transfer	767,695	$27,000,722	1,681,955	$59,873,185
Light (leg or web less than 3 in.), for sale and for interplant transfer	224,167	8,215,356	302,640	11,795,046
Heavy and light, produced and consumed in same works	68,178	.....	64,098	.....
Concrete-reinforcing bars, for sale and for interplant transfer	357,053	12,308,788	617,429	23,081,083
Steel bars (merchant, etc):				
Open-hearth or Bessemer—				
For sale	2,063,602	$4,774,089	2,037,143	87,848,330
Interplant transfers	154,402	6,888,740	129,753	5,364,389
Electric and crucible steel bars, for sale and for interplant transfer	57,469	16,176,741	64,206	18,424,031
Produced and consumed in same works (open-hearth, Bessemer, electric-steel, and crucible-steel bars)	163,273	.....	284,621	.....
Iron bars (merchant, etc.):				
For sale	44,695	3,321,630	47,180	3,486,187
Interplant transfers	552	26,750	5,404	209,695
Produced and consumed in same works	1,724	.....	1,260	.....
Wire rods:				
For sale	441,793	15,396,200	437,311	15,479,319
Interplant transfers	293,736	10,783,139	212,764	7,940,985
Produced and consumed in same works	1,297,499	.....	1,195,060	.....
Bolt and nut rods; spike and chain rods:				
For sale and for interplant transfer	33,969	1,360,886	19,842	842,686
Produced and consumed in same works	117,227	.....	159,696	.....
Plates (No. 12 and thicker), not coated:				
Boiler and other plate, not elsewhere specified—				
For sale and for interplant transfer	1,396,514	50,930,927	1,982,725	74,881,625
Produced and consumed in same works	56,318	.....	60,253	.....
Crucible and electric plate and saw plates, for sale and for interplant transfer	7,414	1,528,713	3,448	971,416
Stainless steel, for sale and for interplant transfer	2,146	1,048,482	(5)	(5)
Sheets (No. 13 and thinner), not coated:				
Automobile-body, for sale and for interplant transfer	400,141	22,264,827	418,499	29,186,173
Black for tinning (tinmill black plate)—				
For sale and for interplant transfer	122,748	7,082,148	114,034	7,651,763
Produced and consumed in same works	1,666,265	.....	1,351,970	.....
Plain—				
For sale and for interplant transfer	2,154,557	102,608,473	1,488,683	89,082,341

IRON and steel products made by the steel-works and rolling mill industry in 1933 were valued at $1,141,017,798, according to a preliminary tabulation of data collected in the biennial census of manufactures and released by the Bureau of the Census. This was a decrease of 18.5 per cent as compared with $1,399,488,877 reported for 1931, the last preceding census year.

The total production of steel in 1933 in the industry amounted to 23,159,749 gross tons, a decrease of 10.6 per cent as compared with 25,895,640 tons reported for 1931. In addition, 31,441 tons of steel castings (including amounts produced and consumed in the same works) were reported by foundries classified in other industries, principally "Foundry and Machine-Shop Products." Steel castings are also produced and consumed by establishments classified in other industries, but no data on this tonnage are collected at the biennial census of manufactures.

The output for sale and interplant transfer of finished rolled and forged products of steel works and rolling mills in 1933 amounted to 11,166,226 tons, valued at 495,544,135, as compared with 13,197,610 tons, valued at $614,899,267 in 1931. The more important classes of these products are as follows: Steel bars, 2,275,473 tons, valued at $107,839,570; automobile-body sheets, 400,141 tons, $22,264,827; plain sheets, 2,154,557 tons, $102,608,473; plates (not including stainless steel, electric, crucible, and saw plates), 1,396,514 tons, $50,930,927; hot-rolled strips and flats for cold rolling, 454,593 tons, $18,040,737; other strips and hoops and bands, 696,140 tons, $28,429,353; structural shapes (not assembled or fabricated), 991,772 tons, $35,216,078; rails, 393,144 tons, $15,157,302; skelp, 467,561 tons, $15,206,009; wire rods, 735,529 tons, $26,179,339. In addition, 4,994,341 tons of finished rolled and forged products was produced and consumed in further manufacture in the same works.

The value of further-manufactured iron and steel products made in departments of steel works and rolling mills from finished rolling-mill and foundry products amounted to $460,008,981. The more important of these were tin plate and terne plate, wire and wire products, wrought pipe and tubes, bolts and nuts, galvanized plates and sheets, corrugated sheets, horseshoes, railroad spikes, cold-rolled strip steel, and cold-drawn steel, all of which are covered by separate preliminary reports.

The industry, as defined for census purposes, embraces establishments

Class and Kind	1933 Gross Tons	1933 Value	1931 Gross Tons	1931 Value
Produced and consumed in same works	674,449	.....	798,076	.....
Stainless steel, for sale and for interplant transfer	8,231	$4,963,184	(5)	(5)
Skelp:				
For sale	275,329	8,938,355	306,568	$10,412,935
Interplant transfers	192,232	6,267,654	312,733	10,906,937
Produced and consumed in same works	549,352	.....	852,912	.....
Cotton ties, for sale	45,733	1,487,954	47,551	1,931,934
Hot-rolled strips and flats: for cold rolling (less than 24 in. in width):				
For sale and for interplant transfer	454,593	18,040,737	402,437	18,052,479
Produced and consumed in same works	270,080	.....	280,623	.....
Other strips and hoops and bands:				
For sale and for interplant transfer	696,140	28,429,353	657,537	29,852,713
Produced and consumed in same works	71,400	.....	62,323	.....
Axles, rolled or forged, for sale and for interplant transfer	54,578	2,788,392	26,894	2,238,631
Car and locomotive wheels, rolled or forged, for sale and for interplant transfer	69,288	6,486,221	84,405	7,689,367
Armor plate and ordnance, for sale	7,510	2,080,491	17,212	6,184,386
Sheet piling, plain, for sale and for interplant transfer	42,451	1,637,825	63,276	2,525,644
Rolled and forged iron and steel products not elsewhere specified:				
For sale	143,478	15,367,546	167,591	19,059,587
Interplant transfers	44,976	2,329,414	39,024	2,634,019
Produced and consumed in same works	54,212	.....	76,334	.....
Scrap iron and steel:				
For sale	687,199	6,991,501	850,290	10,450,074
Interplant transfers	343,753	3,263,656	558,644	6,194,577
Produced and consumed in same works	6,175,738	.....	6,896,240	.....
Cinder and scale:				
For sale	173,167	386,466	217,162	509,088
Interplant transfers	535,514	882,355	403,300	799,308
Produced and consumed in same works	647,172	.....	888,063	.....
Further - manufactured products made in steel works and rolling mills from finished rolling-mill and foundry products	.....	460,008,981	.....	539,858,816

FOOTNOTES

[1] In addition, 14,376 tons of steel castings, valued at $2,465,648, were produced in 1933 for sale by establishments classified in other industries, and 17,065 tons were reported as produced and consumed in the same works in further manufacture by establishments in the "Foundry and machine-shop products not elsewhere classified" industry.

[2] The figures for this item include data for very small quantities (amounting to less than one-tenth of 1 per cent of the totals for 1933 and 1931) of hammered charcoal blooms, billets, etc., which can not be shown separately without disclosing approximations of data for individual establishments.

[3] The figures do not include data for pierced billets and blanks (for seamless pipes and tubes) produced and consumed in the same works, nor for rolled blooms and billets for forgings produced for sale, but do include data for a small quantity of pierced billets and blanks made for sale and for interplant transfer. Data for these products are included in the figures for the respective items under "Semifinished rolled products."

[4] Included in the figure for "Rolled and forged iron and steel products not elsewhere specified" in order to avoid disclosing approximations of the output of individual establishments.

[5] Not called for separately on the schedule; included in the figures for the other classifications under the respective items "Plates" and "Sheets."

engaged in the conversion of pig iron and scrap into steel and in the rolling of iron and steel. In many cases the processes of conversion and rolling are performed in the same plants, and in such cases the values of products represent only the finished products. Some establishments manufacture crude steel and semi-finished rolled iron and steel, which are used as materials by other rolling mills within the industry, and this results in some degree of duplication in the figures for value of products and cost of materials. In many establishments the manufacturing processes are carried beyond the rolling stage. For this reason the industry overlaps a number of others and the products include certain commodities identical in character with the primary products of other industries.

Statistics for 1933 in comparison with 1931 are given in the accompanying tables. All figures for 1933 are preliminary and subject to revision.

Non-Ferrous Foundry Association to Meet

THE annual meeting of the Non-Ferrous Foundry Association for Industrial Recovery will be held at the Hotel Bismarck, Chicago, Sept. 19 and 20. Special sessions will be devoted to the proposed uniform cost estimating system for the industry, proposed standard trade customs including uniform terms of payment and proposed classification of castings as to weight and to intricacy. N. K. B. Patch, Lumen Bearing Co., Buffalo, and A. B. Norton, Aluminum Co. of America, Cleveland, have been nominated for president and vice-president respectively. Sam Tour, 47 Fulton Street, New York, is executive secretary.

It has been reported that wire mills in Holland are suffering severely from lack of orders. One large mill has announced that it will shut down completely unless the Government comes to its assistance. In Latvia the wire works at Libau, which were closed down last year, are to be converted into a rail mill in order to make Latvian railroads independent of imports.

A firm in the State of San Luis Potosi, Mexico, desires contact with an American firm interested in the purchase of slag or treated ore containing 8 to 50 per cent tin. The Mexican firm operates a crude smelter and the resulting slag contains considerable tin. Address Vice-Consul Henry T. Unverzagt, San Luis Potosi —20019.

Wet Grinder Adopts Wood Jointer Principle

WILLIAMS, WHITE & CO., Moline, Ill., are makers of a wet grinder designed for a large variety of surface grinding, with a minimum of necessity for holding fixtures. Descriptive matter calls attention to some rather unique features:

The utility range covers either refinishing operations or the grinding of rough castings.

The equipment may be used to equal advantage either in the production line or in the tool room. (Two cuts are shown herein on page 38.)

The chilled iron table consists of three parts: (1) The feed table, resting on tapered ways for up and down work-adjustment. (Micrometer hand crank.) (2) The center plate support (circular), which is a stationary member mounted on a column extending through the spindle from a cast iron base, and (3) the take-off table from which the work is removed. These three table members are surfaced to a true plane.

The abrasive wheel is sulphur-mounted into a steel ring and is positioned flush with the top of the center plate.

The wheel carrier is mounted upon a counter-balanced, vertical spindle. This spindle is direct motor driven; that is, the motor is pressed directly on the spindle as an aid to spindle balance.

The spindle and its housings are mounted in vertical guides, within a frame, and is raised, to compensate for wheel wear, by graduated hand wheel and screw.

The machine frame is a one piece box section.

The cast iron base pan, in which the frame stands, houses a motor driven centrifugal pump for a maximum circulation of coolant through the spindle, and thence, through ducts in the center plate, to the points of work and wheel contact.

Work surfaces are deeply grooved for debris riddance, by gravity and coolant flow, into a separate sediment pan intervening between the work table and the base. Coolant return troughs are cast integral with the work table.

Operation: The work is positioned on the work table. The work table surface is dropped below the surface of the center plate by whatever fractional or decimal amount of stock is to be removed. The work is then passed over the wheel, from the feed table, by means of a mechanical feed, consisting of a motor driven chain with work driving lugs. The chain speed is variable through change gears.

Carbide Tool Lapper Has Drive Inclosed in Base

MOTOR and other driving mechanism of the new type D-5 tungsten-carbide tool lapping machine built by the Porter-Cable Machine Co., Syracuse, N. Y., are inclosed in a streamlined housing, which also serves as a pedestal base, as shown in the illustration on page 39. A vertical, ball-bearing, 1200 or 1800-r.p.m. motor is employed. Four different speeds are obtainable; with the 1800-r.p.m. motor they are 600, 900, 1200 and 1800 r.p.m. Speeds may be changed quickly by opening a door at the rear and changing the V-belt to different steps on the V-pulleys. The iron lapping disk, which may be either 11¼ or 15 in. in diameter, is carefully balanced after machining and is mounted in oversize spindle bearings of flange precision type.

High-speed steel tools for work on the softer metals may be lapped on the machine, and also small gages, tungsten carbide drawing dies and other parts. With an abrasive disk cemented to the cast iron disk, the machine may be used for removing burrs and for other types of free-hand grinding after milling, stamping and screw machine operations. It is offered also for use in assembly departments for removing surplus metal.

The adjustable carriage and adjustable rail shown on the machine illustrated is optional equipment. The machine equipped with tool carriage is 24 in. long, 24 in. wide and 50 in. high, and weighs 392 lb., net. The height from floor to disk is 39 in.

Articulated Pullmans For Union Pacific

THE first of three highspeed streamlined Union Pacific transcontinental trains being built by Pullman Car & Mfg. Corpn. will go into service shortly with Frigidaire air-conditioned atmosphere throughout. The train now is nearing completion in the Pullman shops.

It will be the first transcontinental flyer of its type, having six cars, articulated to prevent side sway and jouncing, each equipped with specially designed light-weight Frigidaire railway air-conditioning equipment.

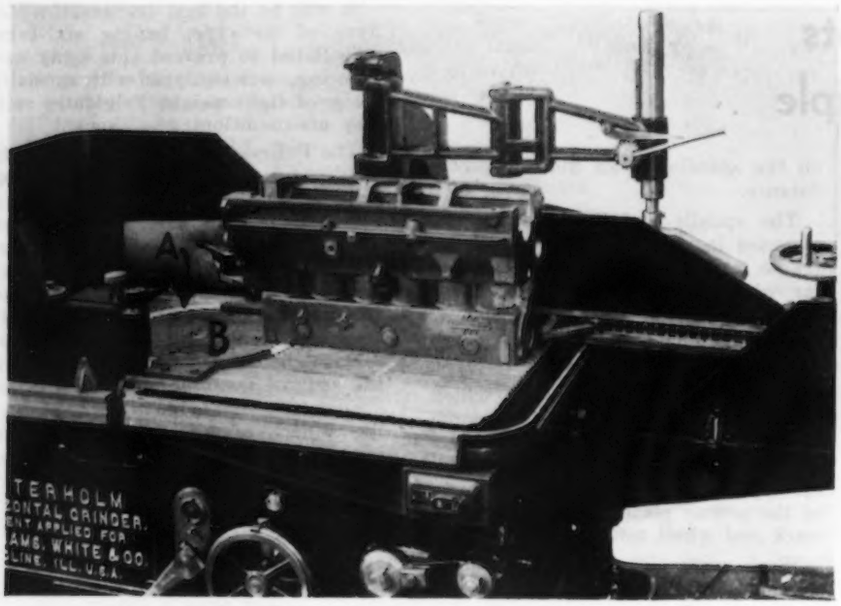
The Pullman cars on the new train are somewhat of an innovation. Each berth — lower or upper — is a compartment in itself with lattice work partitions shielding the occupants from passersby in the aisles and at the same time allowing the free circulation of the dust and dirt-free, cool, dehumidified air. Even individual berths have wash basins. In the ends of the Pullman cars are the customary compartments and drawing rooms, of improved design and with facilities for the circulation of conditioned air.

Mexican Steel Plant Operating at Capacity

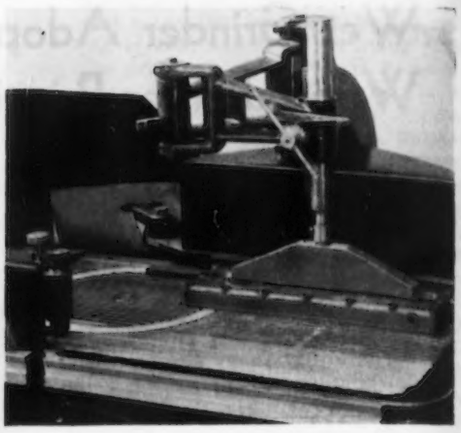
ACCORDING to Department of Commerce, the Monterrey Steel & Iron Co., Monterrey, Mexico, has a sufficient number of orders on hand to keep the plants operating steadily until the close of 1934. A wide assortment of products is produced; however, the largest volume of its business is in structural steel, reinforcing rods, staple wire, car wheels, brake shoes, railroad rails and bolts and nuts, and an excellent business is reported in every item except rails, owing to the fact that none of the railroads have placed any large orders for rails and it has not attempted to roll any.

During the latter part of 1933, this company put in a pipe plant and endeavored to manufacture pipe up to 2 in. in diameter, but this was abandoned early during the current year owing to poor success. Information developed in the trade is to the effect that it does not have the proper type of ore to turn out a good quality of pipe and the belief is expressed that as long as business remains satisfactory in the other items, particularly in structural steel and reinforcing rods, no further attempt will be made in this direction.

A fairly good market for barbed wire is offered in Mexico, and early in 1934 this company attempted to enter into this field; however, no success was had in moving that which it produced and recently it sent notice to its clients that, until further notice, it would not be in a position to offer this product. Under present conditions, it is not believed that it will make a further attempt to enter into this field, and American manufacturers should continue to enjoy the market's requirements.

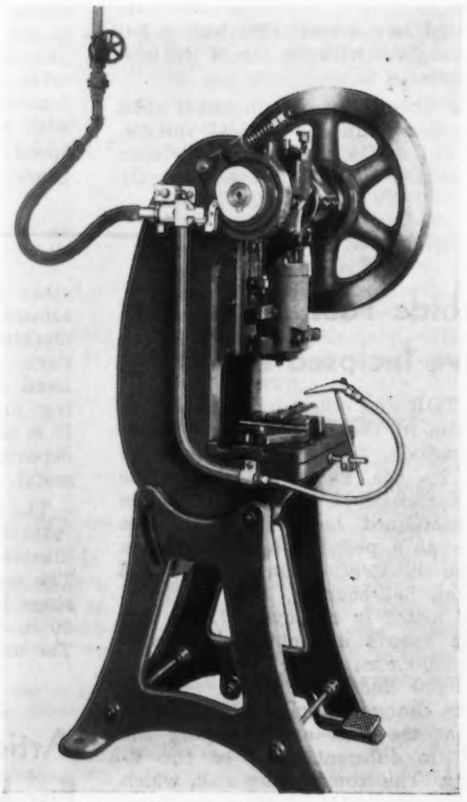


THIS novel surface grinder operates on the principle of the wood-working jointer. Metal is removed from the lower side of the work as it passes over the inset wheel. Heavy work requires no hold down. A new product of Williams, White & Co., Moline, Ill. Detailed text description on page 37



FOR lighter work on the "Osterholm" surface grinder, the pivoted hold-down fixture keeps the work in contact with the wheel as it moves along the table.

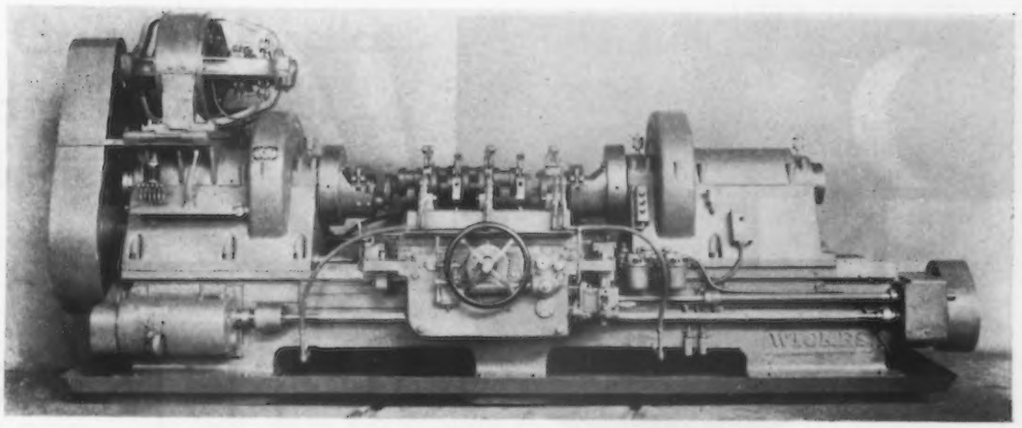
A RECENT development of Bantam Ball Bearing Co., South Bend, Ind., is in the line of large, heavy duty bearings. The young lady in this picture is housed in a Bantam bearing 26 in. inside diameter and 42 in. outside diameter, and 25½ in. in face. The combination of straight and tapered rollers provides for thrust as well as radial loads.

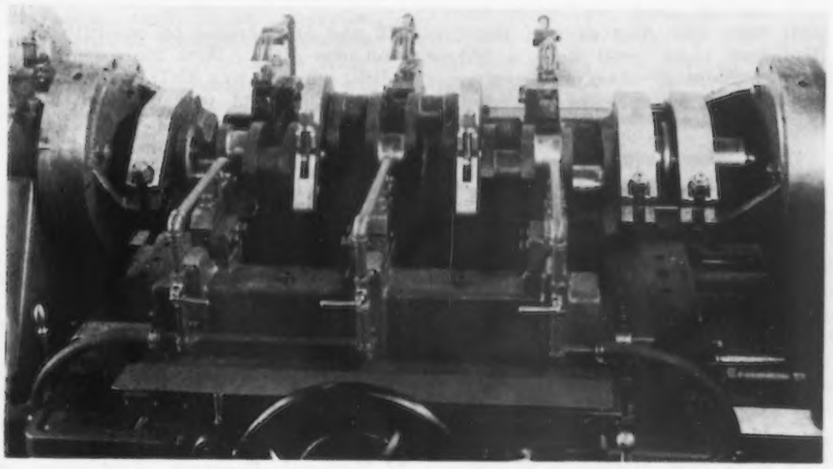


THIS air valve for blowing punchings is adapted for use on both hand and automatic feed presses. Air is automatically shut off at the top stroke by cam and roller action. A new product of the F. J. Littell Machine Co., Chicago.

FOR large tractor, airplane and Diesel crankshafts, Wickes Brothers, Saginaw, Mich., have developed this duplex type, double drive, heavy duty 38 in. lathe. It weighs 22,000 lb., is equipped with front and rear cross slides, power cross and longitudinal feeds and rapid traverse on both. Automatic diameter stop is provided and the variable speed motor gives constant cutting speed on cheeking operations.

Close-up (below) of front cross slide with tools set for machining main bearings.





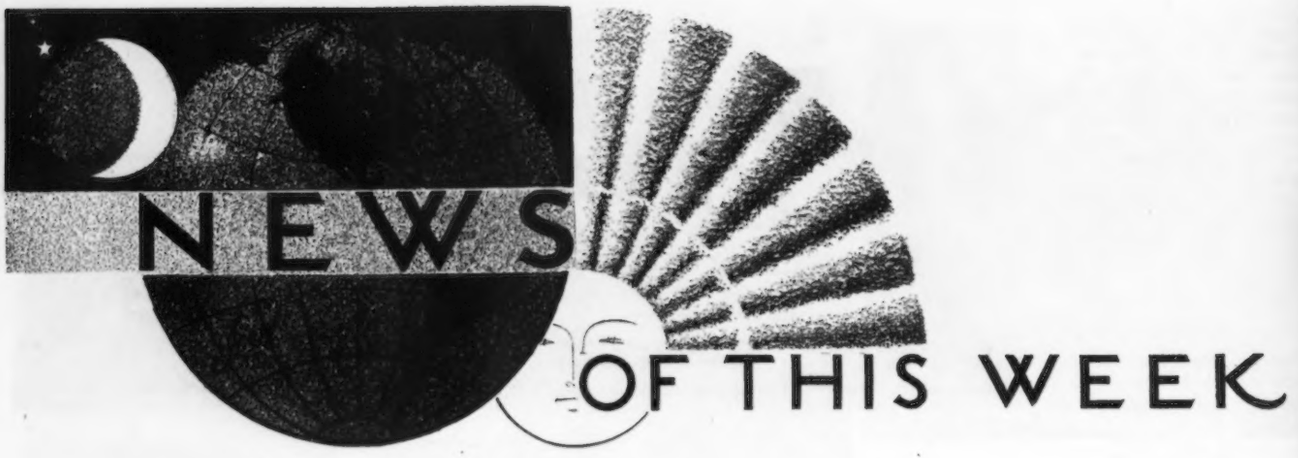
AT LEFT

LAPPING carbide tools is made easy by this new "streamlined" lapping machine that has been developed by Porter-Cable Machine Co. More particulars on page 37.

AT RIGHT

THIS giant bearing, one of several made by the Timken Roller Bearing Co. for use in a cement mill, is designed to carry a load of over a million lb. and weighs over two and three-quarter tons.

The bearing contains 78 tapered rollers mounted in two rows. Although each roller weighs slightly more than twelve and three-quarter lb., there is less than a quarter of a thousandth of an inch variation in size between any one of the 78!



Depreciation Assisting British Steel Exporters

LONDON, ENGLAND, Sept. 11 (*By Cable*).—Domestic English sales of foundry iron and hematite are increasing owing to stock replacements, but consumers are avoiding long-term contracts. Export business is expanding, but the prices realized are unsatisfactory. There are good prospects, however, of autumn buying.

The depreciation of Sterling exchange is assisting British iron and steel exporters and is handicapping foreign competition in the home market.

Most works report an improved demand with firmer price tendencies. This is particularly true of structural steel. Sheets are dull because of the lack of foreign orders. Export orders of rails and plates, however, are in substantial volume.

The tin plate trade is gradually settling down to an acceptance of conditions. Sales in any substantial volume are still lacking, although the position of tin plate works is satisfactory and minimum prices are firmly held.

The Continental iron and steel market is brighter, with increased sales noticeable for beams and bars, but plates and sheets are quiet. China and Japan have placed orders, mainly for bars and plates, aggregating 18,000 tons. There is also brisk demand from South Africa and the Argentine for bars and angles. India is also placing urgent orders to anticipate the new tariff.

British Prices, f.o.b. United Kingdom Ports

Per Gross Ton

Ferromanganese, export	£9	
Billets, open-hrth.	£5 10s.	to £5 15s.
Tin plate, per base box	18s. 2d.	
Steel bars, open-hearth	£7 17½s.	
Beams, open-hrth.	£7 7½s.	
Channels, open-hearth	£7 12½s.	
Angles, open-hearth	£7 7½s.	
Black sheets, No. 24 gage	£9 5s.	
Galvanized sheets, No. 24 gage	£11 5s.	

Official Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £

Current dollar equivalent is ascertained by multiplying gold pound price by 124.14 to obtain franc equivalent and then converting at present rate of dollar-franc exchange.

Billets, Thomas	£2	7s.	
Wire rods, No. 5 B.W.G.	£4	10s.	
Steel bars, merchant	£3	5s.	
Sheet bars	£2	8s.	
Plates, ¼ in. and up	£4		
Plates, 3/16 in. and 5 mm.	£4	2s.	6d.
Sheets, ⅛ in.	£4	7s.	6d.
Beams, Thomas	£3	2s.	6d.
Angles (Basic)	£3	2s.	6d.
Hoops and strip base	£4	2s.	6d.
Wire, plain, No. 8	£5	7s.	6d.
Wire nails	£5	15s.	
Wire, barbed, 4-pt. No. 10 B.W.G.	£8	15s.	

Freight Load Per Car Is Increasing

DESPITE a reduction in the amount of freight traffic handled by the railroads, the average load per car of carload freight has been gradually increasing, according to tabulations just completed by the car service division of the American Railway Association.

For all carload traffic, which includes agricultural products, minerals, livestock and forest products, as well as manufactures and miscellaneous freight, the average load per car was 35½ tons in 1933. This was an increase of three-fifths of a ton over 1932 and an increase of one-fifth of a ton over 1931. With the exception of 1930 when it was 35 7/10 tons, the average for 1933 was greater than for any year since 1922 when these reports were first compiled and for which year the average was 33 1/5 tons. The effect of this increase in the average load per car is that the railroads are getting greater utilization out of their equipment than formerly.

Minimum Soil Pipe Prices Again Revised

WASHINGTON, Sept. 11.—The National Recovery Administration has announced a second modification of Administrative Order No. 18-8, establishing lowest reasonable emergency costs for the cast iron soil pipe industry. The first modification fixed minimum emergency prices on a basis of carload freight rates. The new order requires that 10 per cent be added to all prices on less-than-carload lots.

The part of the order so amended follows:

It is hereby ordered and published that after deduction of all discounts and allowances, the minimum net price per ton of 2000 lb. f.o.b. Birmingham, for the following products of said industry, for the period from date hereof until the expiration of the time limit as provided in Administrative Order No. 18-8, hereafter shall be: $27.50 for extra heavy weight soil pipe, $32.50 for medium weight soil pipe, $37.50 for Standard weight soil pipe, $42.50 for soil pipe and fittings, plus the published all rail freight rate to destination, provided that the delivered minimum net price for less carload shipments shall not exceed the delivered minimum net price for carload shipments by more than 10 per cent.

A petition of the St. Louis Car Co., St. Louis, for a reorganization under the new Federal Bankruptcy Act has been approved. This will prevent action by the Missouri State Court until there can be a hearing on the petition either by the Federal Court or the Referee in Bankruptcy.

All Phases of Gray Iron Practice To Be Covered at Philadelphia Convention Congress

PAPERS on the program of the Fifth International Foundry Congress, to be held in conjunction with the thirty-eighth annual convention and exposition of the American Foundrymen's Association in Philadelphia, Oct. 22 to 26, will cover every phase of gray iron practice. As mentioned briefly in THE IRON AGE, Aug. 16, page 34, there will be discussions of mixtures, melting equipment and fuels, molds, sand, alloys, properties, heat treatment, microscopic examination, and testing. No matter where the foundryman's interest lies, he will find something on the subject at this convention.

The Italian exchange paper is concerned with the making of good castings from a very cheap mixture. "Chemical Composition of Common Cast Iron for Boilers" is the title, and the authors are G. Sirovich, professor at the Royal Superior Institute of Engineers in Rome, and Guido Vanzetti, managing director, Fonderia Milanese Acciaio Vanzetti, Milan. The authors point out how, by careful control, one can produce the desired physical properties from the cheapest mixture.

Another exchange paper which gives a good deal of information on mixtures is the French paper, "Cupola High Test Cast Iron," by R. P. Lemoine, professor at the Superior School of the Foundry, Paris. He tells how to prepare the special low-carbon pig iron which is used for the productiton of high-test gray iron, giving details as to mixtures and melting.

Melting Equipment

Melting equipment and methods are the subject of the shop operation courses which are to be held in the afternoons, and which are among the most popular features of the convention. Besides these purely informal meetings, there will be two papers on melting. George S. Evans, metallurgist, Mathieson Alkali Works, Inc., New York, has a paper on "Cupola Forehearths." He will discuss the different types of forehearths, and give examples of typical installations. Clark B. Carpenter, professor of metallurgy, Colorado School of Mines, Golden, Colo., will present a paper on "Processed Petroleum Coke," giving his experience with processed petroleum coke and of the advantages of this fuel.

One of the newest and most interesting developments in molding practice is the use of permanent molds. Fred Walls, Eaton-Erb Foundry Co., Vassar, Mich., has a paper on "Permanent Mold Castings," in which he discusses the use and application of permanent molds for gray iron castings.

Alloy Cast Irons

Alloy cast irons are no new subject today, but an iron containing 25 to 35 per cent chromium presents many novel points. Garnet Phillips, Frank Foundries, Inc., Moline, Ill., will tell how to melt and pour this highly alloyed iron, what modifications must be made in molding and gating, and what properies are obtained.

Another recent development in gray iron practice is the heat treatment of gray iron castings. This topic will be treated by W. Paul Eddy, Jr., metallurgist, General Motors Truck Corpn., Pontiac, Mich., in a paper on "Heat Treatment of Gray Iron Cylinder Liners."

Fluidity is one of the most important properties of gray iron. It is the subject of a report by the Belgian Foundry Association, in which is investigated the effect of carbon, silicon, manganese and phosphorus upon this characteristic.

Gray iron is one of the most difficult metals to polish for microscopic examination, because of the graphite flakes present. A resume of the methods most generally used, and recommendations for a polishing procedure which produces clear, true pictures, will be given in a paper on "Polishing Cast Iron for Microscopic Examination," by C. F. Surls, Michigan State College, East Lansing, Mich.

Testing to Be Considered

J. Novarro-Alacer, president of the Spanish committee on testing materials and professor at the Superior School of the Foundry at Valencie, will present a paper on "The Breaking Strength and Physical Properties of Gray Cast Iron." He has worked out the mathematical relation between the breaking load and the other strength properties of gray iron, so that he is able to get any property by a simple calculation, when the breaking load (whether for the transverse, shear or compression test) is known.

A join session of cast iron tests and specifications will be held with the American Society for Testing Materials. At this meeting the subject of test bars and test methods will be discussed by authorities in this field. Dr. H. F. Moore and J. H. Picco, of the University of Illinois, will have a paper on "Fatigue Tests of High Strength Cast Irons." Dr. J. T. MacKenzie, American Cast Iron Pipe Co., Birmingham, will present a discussion of "Test Bars," and Garnet P. Phillips, metallurgist, Frank Foundries, Inc., Moline, Ill., will tell of "Horizontally Poured Test Bars." An "Investigation of Test Bars" will be reported by C. M. Saeger, of the United States Bureau of Standards, Washington.

Discuss Application Of Bearing Materials

JOHNSON BRONZE CO. of New Castle, Pa., held a three-day conference Aug. 30 to Sept. 1, inclusive, to discuss plans for sales helps and cooperative relations with its many industrial distributers, located in important industrial centers from coast to coast.

Those attending were: Ira M. Valentine, southern representative, Atlanta; E. J. Sullivan, New England representative, Holyoke, Mass.; Henry Reggiori, branch manager, New York; R. C. Clark, branch manager, Philadelphia; A. J. Marceau, branch manager, Chicago; D. M. Jones, Cleveland district; L. E. Cramer, western New York and Pennsylvania; E. M. Holtz, Chicago; E. L. Christopher, Chicago; H. E. Storrs, Cincinnati; P. W. Marceau, field engineer; Carl H. Leis, chief engineer; Eugene Scanlon, advertising department; R. R. Gibson and Robert Steinbrink, sales department.

The application of bearing materials and bearing problems were discussed by the company's chief engineer, C. H. Leis, while Louis Sandler, chief metallurgist, discussed alloys and their characteristics in bearing applications.

Lee Berthold, vice-president in charge of sales and advertising, announced the promotion of Roy C. Clark of Philadelphia to the position of assistant sales manager and the transfer of Robert Steinbrink from the New Castle office to the Philadelphia branch.

The Fulton Iron Works, St. Louis, manufacturer of sugar mill machinery, Diesel engines and castings, has filed a voluntary petition under Sections 77-A and 77-B of the Federal Bankruptcy Act to effect reorganization. The petition was approved as properly filed in good faith by Federal Judge Davis, who set Sept. 28 for a hearing on the plan. Assets of the company are given as $1,814,600, and liabilities, aside from capital stock, $1,370,309. There are 10,000 shares of preferred stock, with a par value of $1,000,000, and 88,500 shares of no par value common stock.

Program of the Metal Congress

Technical sessions will be held in Hotel Pennsylvania, New York, and exhibits in the Port of New York Authority Building, Oct. 1 to 5, inc.

Program of American Society for Metals

MONDAY, OCT. 1

10 a. m.—Hotel Pennsylvania Ball Room
Heat Treating Session

"Physical Properties of Case Hardened Steels," by O. W. McMullan, Timken Detroit Axle Co., Detroit.

"Heat Treatment in Controlled Atmospheres Including Gaseous Carburizing," by C. R. Austin, Pittsburgh.

"Influence of Non-Metallic Inclusions Upon the Precipitation of Primary Cementite in Hypereutectoid Steels," by E. G. Mahin and E. F. Lee, University of Notre Dame, Notre Dame, Ind.

2 p. m.—Port of Authority Bldg.
Research Session

"A Graphical Method for Calculating Heat Loss Through Furnace Walls," by C. E. Weinland, Johns-Manville Research Laboratories, Manville, N. J.

"Properties of Some Cast Alloy Steels," by T. N. Armstrong, Norfolk Navy Yard, Norfolk, Va.

"A Comparison of the Corrosion Resistance of Several Wrought Irons Made by Different Processes," by O. A. Knight and J. R. Benner, Pennsylvania State College, State College, Pa.

"Practical Observations of Some High Carbon, High Chromium Tool Steels," by W. H. Wills, Ludlum Steel Co., Dunkirk, N. Y.

TUESDAY, OCT. 2

10 a. m.—Hotel Pennsylvania Ball Room
X-Ray Session

"Grain Distortion in Metals During Heat Treatment," by C. Nusbaum, Case School of Applied Science, Cleveland, and N. P. Goss, Cold Metal Process Co., Youngstown.

"X-Ray Exposure Charts for Steels," by H. R. Isenburger, St. John X-Ray Service, Inc., Long Island City, N. Y.

"New Development in Electrical Strip Steels Characterized by Fine Grained Structure Approaching the Properties of a Single Crystal," by N. P. Goss, Cold Metal Process Co., Youngstown.

2 p. m.—Port of Authority Bldg.
Aging Session

"Prolonged Tempering at 100 Deg. C. and Aging at Room Temperature of 0.8 Per Cent Carbon Steel," by G. A. Ellinger and R. L. Sanford, National Bureau of Standards, Washington.

"The Effect of High Hydrostatic Pressures on Aging," by L. R. Van Wert, Lecturer on Metallurgy, Harvard University, Cambridge, Mass.

"Directional Properties in Rolled and Annealed Low Carbon Steel," by Arthur Phillips and H. H. Dunkle, Yale University, New Haven.

"Cutting Temperatures Developed by Single-Point Turning Tools," by O. W. Boston and W. W. Gilbert, University of Michigan, Ann Arbor.

WEDNESDAY, OCT. 3

10 a. m.—Hotel Pennsylvania Ball Room
Annual Meeting of the A. S. M.

"Campbell Memorial Lecture," by Dr. V. N. Krivobok, Carnegie Institute of Technology, Pittsburgh.

2 p. m.—Port of Authority Bldg.
Research Session

"Alloys of Iron and Manganese, Part XIII," by F. M. Walters, Jr. and Cyril Wells, Carnegie Institute of Technology, Pittsburgh.

"The Influence of Oxide Films on the Wear of Steels," by S. J. Rosenberg and Louis Jordan, National Bureau of Standards, Washington.

"The Metastability of Cementite," by H. A. Schwartz, National Malleable and Steel Castings Co., Cleveland.

"Magnetic Properties of Iron as Affected by Carbon, Oxygen and Grain Size," by T. D. Yensen, Westinghouse Electric & Mfg. Co., and N. A. Ziegler, West Penn Electric Co., Pittsburgh.

THURSDAY, OCT. 4

10 a. m.—Hotel Pennsylvania
Research Session

"The Cobalt-Molybdenum System," by W. P. Sykes and Howard F. Graff, General Electric Co., Cleveland.

"Malleable Castings," by Albert Sauveur and H. L. Anthony, Harvard University, Cambridge.

"Oxidation of a Low Carbon Steel in the Temperature Range 1650 to 2100 Deg. Fahr.," by C. A. Siebert, U. S. Rubber Co., and Clair Upthegrove, University of Michigan, Ann Arbor.

"The Ductility of Chromium-Nickel Austenitic Steels at Elevated Temperatures," by H. D. Newell, Babcock & Wilcox Tube Co., Beaver Falls, Pa.

2 p. m.—Port of Authority Bldg.
Steel Melting Session

"Studies on the Metallurgy of Arc-Deposited Weld Metal," by S. L. Hoyt, A. O. Smith Corpn., Milwaukee.

"The Effect of Deoxidation on Some Properties of Steels," by C. H. Herty, Jr., Bethlehem Steel Co., Bethlehem, Pa.

"Non-Metallic Inclusions in Steels," by S. F. Urban, National Tube Co., Ellwood City, Pa., and John Chipman, University of Michigan, Ann Arbor.

FRIDAY, OCT. 5

10 a. m.—Hotel Pennsylvania Ball Room
Grain Size Symposium

"Grain Size in Metals With Special Reference to Grain Growth in Austenite," by M. A. Grossmann, Illinois Steel Co., Chicago.

"General Relation Between Grain Size and Hardenability and the Normality of Steels," by E. S. Davenport and E. C. Bain, U. S. Steel Corpn. Res. Labs., Kearny, N. J.

"Grain Size in Relation to Machinability and Other Properties of Bessemer Screw Steel," by H. W. Graham, Jones & Laughlin Steel Corpn., Pittsburgh.

"Grain Size Control of Open-Hearth Carbon Steels," by S. Epstein, Battelle Memorial Institute, Columbus, Ohio; J. H. Nead, Inland Steel Co., Indiana Harbor, Ind., and T. S. Washburn, Inland Steel Co.

"The PF Characteristic of Steel," by B. F. Shepherd, Ingersoll-Rand Co., Phillipsburg, N. J.

"Effect of McQuaid-Ehn Grain Size on Hardness and Toughness of Automotive Steels," by H. W. McQuaid, Republic Steel Corpn., Detroit.

2 p. m.—Port of Authority Bldg.
Grain Size Symposium (continued)

"Effect of McQuaid-Ehn Grain Size of Steel in Forging," by W. E. Sanders, Buick Motor Car Co., Flint, Mich.

"Influence of Grain Size on the High Temperature Characteristics of Ferrous and Nonferrous Alloys," by A. E. White and C. L. Clark, University of Michigan, Ann Arbor.

"The Importance of Grain Size of Sheet Steel for Deep Drawing," by R. L. Kenyon, American Rolling Mill Co., Middletown, Ohio.

"The Influence of Grain Size on Magnetic Properties," by W. E. Ruder, General Electric Co., Schenectady.

"Factors Determining the Impact Resistance of Hardened Carbon Steels," by Howard Scott, Westinghouse Electric & Mfg. Co., East Pittsburgh.

Concurrent Program of American Institute of Mining Engineers (Iron & Steel Divisions)

MONDAY, OCT. 1

10 a. m. to 5 p. m.—Registration, Floor 18, Hotel Pennsylvania

TUESDAY, OCT. 2

(Institute of Metals)

10 a. m.—Hotel Pennsylvania Roof Garden
Equilibrium Diagrams Session

"An Investigation of the Mutual Liquid Solubility of Zinc and Lead With a Determination of the Eutectic Compositions and Freezing Points by Thermal Analysis," by R. K. Waring, E. A. Anderson, R. D. Springer and R. L. Wilcox.

"The High-Zinc Region of the Copper-Zinc Phase Equilibrium Diagram," by E. A. Anderson, M. L. Fuller, R. L. Wilcox and J. L. Rodda.

"Equilibrium Relations in Aluminum-Nickel Alloys of High Purity," by William L. Fink and L. A. Willey.

"Secondary Structure and the Age Hardening of Certain Alloys," by K. H. Moore.

2 p. m.—Hotel Pennsylvania Roof Garden
(Iron & Steel and Institute of Metals Divisions)
Metallographic Session

"Orientation of Ferrite in Pearlite," by Robert F. Mehl and D. W. Smith.

"Uses of the Polarizing Microscope in the Study of Inclusions in Metals," by S. L. Hoyt and M. A. Scheil.

"Graphite in Low Carbon Steel," by A. B. Kinzel and R. W. Moore.

WEDNESDAY, OCT. 3

9.30-11 a. m.—Hotel Pennsylvania Roof Garden

(Institute of Metals)
Die Casting Session

"Effect of Composition on Mechanical Properties and Corrosion Resistance of

Aluminum Alloy Die Castings," by E. H. Dix, Jr., and J. J. Bowman.

"Die Casting of Brass," by John R. Freeman, Jr.

"Studies of Phase Changes During Aging of Zinc Alloy Die Castings and Their Technological Significance," by M. L. Fuller and R. L. Wilcox.

"Role of the Spectrograph in Control of Die Casting Production," by T. A. Wright.

(Adjourning at 11 o'clock for Campbell Memorial Lecture.)

9.30-11 a. m.—Hotel Pennsylvania Salle Moderne

(Iron & Steel Division)

Raw Materials Session

"Genesis and Development of Blast Furnaces from 6000 B. C.," by Charles Hart.

"Manufacture, Properties and Uses of Sponge Iron," by G. B. Waterhouse.

(Adjourning at 11 o'clock for Campbell Memorial Lecture.)

2 p. m.—Port of Authority Bldg.
(Iron & Steel and Institute of Metals Divisions)

Joint Session

"Steels for Die Casting Dies," by Sam Tour.

"Properties of Some Brass Die Casting Alloys," by O. B. Malin and W. W. Sieg.

"Hot-Working Die Steels," by James P. Gill.

6.30 p. m.—Hotel Pennsylvania

(Iron & Steel and Institute of Metals Divisions)

Dinner. Speaker, Sam Tour; subject, "Die Castings."

THURSDAY, OCT. 4

9.30 a. m.—Hotel Pennsylvania Salle Moderne

(Iron & Steel Division)

Slag Control Session

Slag Control in the making of iron and steel will be discussed from many angles by L. F. Reinartz, W. J. Reagan, A. F. Miller, T. S. Washburn, F. B. Foley, M. Furness, C. H. Herty, Jr., A. B. Kinzel and others.

10 a. m.—Hotel Pennsylvania Roof Garden
(Institute of Metals)

Theoretical Metallurgy

"Influence of a Grain Boundary on Deformation of a Single Crystal," by Richard F. Miller.

"Effect of Quenching Strains on Lattice Parameter and Hardness Values of High Purity Aluminum-Copper Alloys," by Arthur Phillips and R. M. Brick.

"X-Ray Study of Orientation Changes in Cold Rolled Single Crystals of Alpha Brass," by Carl H. Samans.

2 p. m.—Hotel Pennsylvania Salle Moderne

(Iron & Steel Division)

Continuation of Slag Control Session

2 p. m.—Hotel Pennsylvania Roof Garden

(Institute of Metals)

Theoretical Metallurgy

"Rates of Precipitation in Aluminum-Rich, Aluminum-Silver Alloys," by A. Hone.

"Correlations of Equilibrium Relations in Binary Aluminum Alloys," by W. L. Fink and H. R. Freche.

"Intermetallic Solid Solutions," by E. R. Jette.

TUESDAY, OCT. 2

9.30 a. m.—Hotel New Yorker

Galvanizing Session

"Corrosion and Hot Galvanizing," by Allen B. Dove, Steel Co. of Canada, Ltd., Hamilton, Ont.

2 p. m.—Hotel New Yorker

Technical Session

"Smelting, Casting and Rolling Electrolytic Copper," by W. S. Adams, and Mr. Miller, Anaconda Copper Mining Co., Great Falls, Mont.

"Lubrication for Drawing Copper Wire in the Three Stages—Heavy, Medium and Fine," by John G. Richards, G. Whitfield Richards, Philadelphia.

WEDNESDAY, OCT. 3

9.30 a. m.—Hotel New Yorker

Technical Session

"Bright Annealing of Wire in Electric Furnaces," by O. S. Haskell, General Electric Co., Schenectady.

"Steel Wire Manufacture," by F. H. Nullmeyer, Youngstown Sheet & Tube Co., Youngstown.

2 p. m.—Hotel New Yorker

Session with Braiding & Wire Covering Machinery Mfrs. Association

"Covering of Wire by Braiding," by S. B. Blaisdell, Fidelity Machine Co., Philadelphia.

"Covering of Wire by Winding and Enameling," by R. W. Withington, American Insulating Machinery Co., Philadelphia.

"High Speed Carrier Developments," by R. V. Olsen, Mossberg Pressed Steel Corpn., Attleboro, Mass.

4 p. m.—Hotel New Yorker

Annual Meeting of the Wire Association

THURSDAY, OCT. 4

9.30 a. m.—Hotel New Yorker

Technical Session

"Properties and Manufacture of Spring Wire," by E. J. P. Fisher, Keystone Steel & Wire Co., Peoria, Ill.

"Lime Coating of Rod vs. ?" by H. G. Hobbs, Cleveland.

2 p. m.—Hotel New Yorker

Technical Session

"Canadian Copper from Mine to the Wire User," by D. Horsfall, Canada Wire & Cable Co., Toronto.

Concurrent Program of American Welding Society Session

MONDAY, OCT. 1

9.30-5 p. m.—Hotel New Yorker, Registration

2.30 p. m.—Hotel New Yorker

Technical Session

"Steel in Residence Construction," by F. T. Llewellyn, U. S. Steel Corpn.

"Use of Polarized Light as Applied to Welding Products," by E. W. P. Smith, Lincoln Electric Co.

"Impact Resistance of Welded Joints," by W. Spraragen, American Bureau of Welding.

TUESDAY, OCT. 2

9.45 a. m.—Hotel New Yorker

Technical Session

"A Critical Examination of Welded Pipe Materials," by D. H. Corey, Detroit Edison Co., and A. E. White, University of Michigan.

"Investigation of Welded Seat Angle Connections," by Inge Lyse and N. G. Schreiner, Fritz Engineering Laboratories, Lehigh University.

"Photo-Elastic Studies of Seat Angle Problems," by Inge Lyse and Douglas M. Stewart, Fritz Engineering Laboratories, Lehigh University.

"Welding in Engineering Education," by J. H. Zimmerman, Massachusetts Institute of Technology.

2 p. m.—Hotel New Yorker

Technical Session

"Effect of Peening on Physical Properties of Welds and Stress Relief," by O. M. Harrelson, Georgia School of Technology.

"Note on the Fatigue Testing of Welds," by J. H. Zimmerman, Massachusetts Institute of Technology.

"Some Tests of Thermit Welds," by Percy Hodge, Stevens Institute of Technology.

"Welding of Cast Iron," by John A. Needy, Ohio Northern University.

"Residual Welding Stresses," by R. E. Jamieson, McGill University.

"Welding of Cromansil Steel," by H. M. Boylston, Case School of Applied Science.

WEDNESDAY, OCT. 3

9.45 a. m.—Hotel New Yorker

Technical Session

"Silver Solders and Fluxes," by R. H. Leach, Handy & Harman Co.

"Metal Spraying," by E. V. David, Air Reduction Sales Co.

"Hard Facing," by B. E. Field, Haynes Stellite Co.

"Flame Machining," by representative, Linde Air Products Co.

2 p. m.—Hotel New Yorker

Railroad Session

"Track Maintenance," by I. H. Schram, Erie Railroad.

"Welded Rail Joints in Main Line Track," by H. S. Clarke, Delaware & Hudson Railroad.

"Technical Phases of Application of Welding in Hi-Tensile Division of E. G. Budd Mfg. Co.," by M. B. Butler.

THURSDAY, OCT. 4

9.45 a. m.—Hotel New Yorker

Technical Session

"Study of Alternating Current Arc Welding Circuit Characteristics," by A. M. Candy, Westinghouse Electric & Mfg. Co.

"Automatic A. C. Arc Welding Class 1 Pressure Vessels," by O. A. Tilton, General Electric Co.

"Impact Resistance of Some Steels and Welds at Sub-Zero Temperatures," by R. K. Hopkins, M. W. Kellogg Co.

"Flame Cutting," by Bradley Stoughton, Lehigh University.

2 p. m.—Hotel New Yorker

Symposium on Qualifying Operations of Welding Equipment

"Boiler Welding," by W. D. Halsey, Hartford Steam Boiler Inspection and Insurance Co., and Alexander Kidd, M. W. Kellogg Co.

"Shipbuilding," by E. D. Debes, Bethlehem Shipbuilding Co., and H. W. Pierce, New York Shipbuilding Co.

"Structural Welding," by G. D. Fish, Westinghouse Electric & Mfg. Co.

"Pipe Welding," by Dr. S. Lewis Land, Heating and Piping Contractors National Association.

"Testing of Welders," by J. W. Owens, National Weld Testing Bureau.

7 p. m.—Hotel New Yorker

Annual Banquet (Stag)

... PERSONALS ...

D. C. SELHEIMER, general factory manager, Massey-Harris Co., farm machinery, Racine, Wis., has been appointed general manager to succeed LINDSAY M. DONALDSON, who resigned effective Sept. 15 to make new connections in the East. Mr. Selheimer started his production and engineering career with the Packard Motor Car Co., Detroit. After World War service he joined the Advance-Rumley Co., Battle Creek, Mich., resigning early in 1929 to join the Massey-Harris Co. A year later he was appointed production manager and successively he was appointed Racine factory manager and general factory manager of the plants both at Racine and Batavia, N. Y.

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F. T. IRGINS, chief engineer; WILLIAM C. CLAUSEN, general sales manager, and HUGO BIERSACH, advertising manager, have been elected directors of the Outboard Motors Corpn., Milwaukee, which in addition to marine engines, manufactures portable centrifugal and high pressure pumps, power lawn mowers and home workshop equipment.

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DAVID C. ZUEGE, metallurgist, Sivyer Steel Casting Co., Milwaukee, has been elected chairman of the Milwaukee chapter of the American Society for Metals. He succeeds R. N. HURLISS, Milwaukee Vocational School. A. E. RAUCH, Globe-Union Mfg. Co., has been elected vice-chairman, and W. J. SPARLING, Chain Belt Co., secretary-treasurer.

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JOHN AGNEW, formerly associated with Continental Roll & Steel Foundry Co., has been appointed roll sales manager for Aetna-Standard Engineering Co., Youngstown.

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VINCENT K. SMITH has been appointed motor sales manager of the Ohio Electric Mfg. Co., Cleveland. After his graduation from Dartmouth College, Mr. Smith served abroad during the war, and on his return completed his educational training at Harvard Law School. Since that time he has been closely identified with several machinery and electrical manufacturing enterprises.

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CHARLES G. KESHEN, formerly New England sales representative for Gifford-Wood Co., Hudson, N. Y., has become identified with the Boston office of the Boston Gear Works, Inc., North Quincy, Mass.

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W. H. DAVIDSON, of Hughson & Merton, Western sales representatives for the Wrought Washer Mfg. Co., Milwaukee, has been placed in charge of the newly-opened branch office of the Washer company, at 324 Atlas Building, Salt Lake City, Utah.

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R. W. MITCHELL, technical director of the Magnus Chemical Co., Garwood, N. J., sailed for Europe on Aug. 18 for an extended business and pleasure trip.

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MELVIN H. PURVIS, United States Department of Justice Chief at Chicago, and COL. HENRY BARRETT CHAMBERLIN, operating director of the Chicago Crime Commission, will be guest speakers at the September dinner meeting of the Chicago Purchasing Agents' Association, to be held at the Columbia Yacht Club, Sept. 13.

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DR. R. LEONARD HASCHE, for the past three years director of chemical research, A. O. Smith Corpn., Milwaukee, has become associated as director of research and development with the Tennessee Eastman Corpn., Kingsport, Tenn., subsidiary of the Eastman Kodak Co. Prior to joining the Smith Corpn., Dr. Hasche was superintendent of research for the American Smelting & Refining Co., New York. He is president of the Carbonic Development Corpn., which holds patents on a new process for the production of dry ice, which he developed while in Milwaukee.

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HARRISON L. HART, purchasing agent of the Wico Electric Co., Springfield, Mass., has been made Midwest district manager of the company, with headquarters at 160 East Illinois Street, Chicago.

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HAROLD S. PYLE, assistant manager of the New Castle, Pa., works, American Sheet & Tin Plate Co., has been appointed assistant manager of the Monessen, Pa., works. R. E. STURDY, master mechanic at New Castle, has been appointed assistant manager at Martins Ferry, Ohio, plant; JOHN CROMBLE, assistant manager of the Shenango works at New Castle, Pa., has been made assistant manager at Ellwood, Ind., plant, and C. E. CRAWFORD, assistant manager at Morgantown, W. Va., has been named as assistant manager of the Shenango works at New Castle, Pa.

... OBITUARY ...

J. B. SMITH, for the past 26 years plant engineer of the Malleable Iron Fittings Co., Branford, Conn., died of heart disease on Aug. 21, aged 66 years. After his graduation from the Sheffield Scientific School, Yale University, he began his professional career with the Thomson-Houston Electric Co. He was later identified with the Providence Railway System and the Central Power Co., Mystic, Conn.

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ALFRED B. HICKEN, pioneer inventor and designer of equipment for building and maintaining concrete highways, and founder and president of the Highway Machinery Co., Waukesha, Wis., died Sept. 1, aged 55 years. He had been ill a year.

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FRANKLIN D. WILLIAMS, one of the owners of the Bay State Crucible Co., and a director of the New England Brass Foundry, died at his home in Taunton, Mass., on Sept. 6, after a short illness. He was born in that city Nov. 21, 1861.

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EDWARD LAWRENCE WINGATE, for 20 years manager of the structural and ornamental steel firm of G. W. & F. Smith Co., Roxbury, Mass., and at the time of his death interested in storage warehouse properties, died at his home in Malden, Mass., Sept. 2.

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JOSEPH SHAW, brother of Fred D. Shaw, president of the New England Foundrymen's Association, and a sales representative of the Walker & Pratt Mfg. Co., Watertown, Mass., died at his home in West Roxbury on Sept. 6. He was born in Watertown 37 years ago.

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G. L. EVANS, a vice-president of the Wagner Electric Corpn., St. Louis, died in a hospital there on Sept. 9 after an illness of two weeks. He was born in St. Louis 48 years ago, and was educated in the public schools and Washington University School of Engineering. He began his business career with the Wagner company, following his graduation from the university 25 years ago, and had been in its service continuously since.

Cost of Living Was Higher in August

THE cost of living of wage-earners continued its upward trend with a rise of 0.6 per cent from July to August, according to the monthly survey of the National Industrial Conference Board. The increase brought living costs to a level 3.5 per cent above that of a year ago, but 21.0 per cent below that of August, 1929.

The purchasing value of the dollar was 125.6c. in August as compared with 126.4c. in July, 139.9c. in April, 1933, and 100c. in 1923.

THIS WEEK IN WASHINGTON

Administration Occupied With NRA Reorganization

Plans Still Nebulous as President Confers With General Johnson—Price Control May Go With Collective Bargaining Certain To Stay—Freight Rate Increase Likely

By L. W. MOFFETT
Resident Washington Editor, THE IRON AGE

WASHINGTON, Sept. 11.—Determination of the future policy of the NRA is one of the major problems now being considered by President Roosevelt at Hyde Park. The first conference has been held with Gen. Hugh S. Johnson. A welter of conflicting reports, some coming from official sources, adds to the growing confusion that has undoubtedly increased apprehension in the business and industrial world. Adding to the muddled situation is the pre-election campaign, with its political color that cannot be taken entirely for what it seeks to reflect.

The President himself has made it clear that he proposes to make a permanent organization of NRA. Like most "emergency" institutions set up by the Government it is to be woven into the fast-growing Governmental bureaucracy. But it is only fair to say that business and industry themselves, more than any other sources, are responsible for setting up NRA. Not that it has followed the lines that they preferred, but business and industry pressed the hardest for "self-government."

Labor Gained Most

As was to be expected, organized labor made its demands and was given 7-A. Its capitalizing of that section of the recovery act is well known. From it has grown directly and indirectly unprecedented labor controversies, strikes and threatened strikes, with widespread violence such as is now marking the general textile walkout. Not only industry but the Administration is finding the handling of the labor situation a most vexing problem, delaying further the prospects of recovery. The Administration's policies on this issue also have been conflicting. But the National Labor Relations Board now has turned definitely to the policy of majority representation for purposes of collective bargaining.

Collective Bargaining to Stay

Likewise, the Administration policy regarding NRA, though indefinite in its general respects, has turned to two specific purposes. One is that the right of collective bargaining is here to stay. Another is that price control in codes is to be further minimized. There are those who have begun to doubt if even a semblance of price protection is to be permitted. These points were indicated by the President at Hyde Park last Thursday when he discussed general plans for reorganization of NRA. The President emphasized further the growing trend away from price control provisions in codes. He is reported to have expressed strong doubts as to price fixing and even price posting, and is understood to have indicated that Congress will be asked to restore the anti-trust laws as they apply to these practices.

Other Permanent Features

The intention is to retain the provision against employment of child labor and to wipe out the sweatshop, which, unfortunately, has not been wiped out. There still are employers paying coolie wages, as ample reports to NRA plainly show. More unfortunately, enforcement of this and other code violations is not moving with much more than snail-like speed. Minimum wages and maximum hours also are in the plan for making NRA permanent. Most employers favor these restrictions, but see difficulty in maintaining them if protection against "chiseling" is not provided in some form. Without some assurance on this question, it is quite clear that sagging interest in NRA will recede further or entirely disappear.

The assumption is that the reorganized NRA will be operated by a board, perhaps with General Johnson

at its head, though there are those who look for his exit soon. This is simply speculative. The rift between the General and Donald Richberg, former general counsel for NRA, is held to have weakened the position of the administrator. Tied in with the rift is the report that Miss Perkins has taken sides with Mr. Richberg—or Mr. Richberg has taken sides with Miss Perkins—and it is significant that Miss Perkins' department now is the dominating factor in labor policies. This is a natural development, though General Johnson was undoubtedly a dominating factor during the life of the National Labor Board, which shared quarters with, but was not an integral part of, NRA. The National Labor Relations Board, its successor, is entirely removed from NRA influence.

Reorganization Temporary

The pending reorganization of NRA will be only a stop-gap. Its permanent set-up is to be determined by the new Congress, which may have more backbone than its predecessor, or, at least may fear the wrath of the White House less than did the latter. This, however, will depend on the outcome of the coming election, reflecting as it will the country's present sentiment toward the New Deal.

It may be that Congress will want to take NRA apart and parcel it in pieces to other Government bodies. It might place 7-A under the National Labor Relations Board, which now assumes that jurisdiction; wages, hours and child-labor provisions under the Department of Labor; fair trade practices under the Federal Trade Commission or the Department of Commerce, with perhaps a separate Government unit to supervise code authorities.

Price Policies Disturbing

It is evident that NRA is disturbed over the price question. With living costs rising, there is a decided growth in "consumer consciousness" and strong resistance on the part of buyers. The Administration appears to see that one of its greatest efforts may be to keep prices down, especially in such necessities as foodstuffs, though higher prices for the farmer are still firmly intrenched. It is a complete turn about. The slogan of getting prices up to the 1926 level died away with the failure of the theory that rising wages would boost purchasing power to the point where industry would be revived and higher prices balanced with higher wages. Managed currency, still an objective, has given rise to fear throughout the country of dangerous inflation.

Indeed, the inflationary movement has become almost universal. New gold values in the British pound and the American dollar have given the world some $19,000,000,000 of basic bullion. To this can be added $15,500,000,000 in silver, a total of $34,500,000,000. Building up credit to such a huge proportion, when the speculative spree was built on about $12,000,000,000 gold, certainly is indicative of wild inflation, though Administration officials are scoffing at the idea of such a development and the country is hoping there is no likelihood of such an orgy.

Yet tremendous Government expenditures proceed apace and will continue to do so. Some will be compulsory, such as those for relief, which many think will reach their highest volume this winter. Either heavy taxes or inflation will be certain, and the budget in course of preparation is said to point to heavy taxes.

Inflation Feared

Fear of excessive inflation no doubt was one reason for the treasury assurance that it would resort to the usual methods in floating bonds for September-October refinancing. Nevertheless concern which has been prevailing over the Administration's monetary policies was heightened by the resignation of Lewis Douglas, budget director, whose conservative views were out of sympathy with treasury policies, now almost entirely in the hands of so-called liberals.

The apparent policy of the Administration to put a halt on rising prices, however, does not appear to apply to controlled rises. It is definitely turning against price protection in NRA codes and seems to feel that this has been a source of undue price advances. The sharp run-in between NRA and the national code authority for the retail solid fuel industry was a reflection of this attitude. NRA of course accepted the resignation of the national code authority and announced its purpose to keep a tight hand in Washington over the establishment of "emergency" retail prices of fuel.

Higher Rail Tariffs Likely

Meanwhile, it is the general view that industry will face higher rail rates. It is believed that railroads will be given some increases in connection with their petition for higher rates. Hearings on the case will begin Oct. 1 and are expected to be concluded in a short time. It is realized that the railroads face a difficult situation, though the same can be said of agriculture and industry. It is a question also as to whether or not higher rates not only will turn traffic from rail carriers to trucks and water carriers but also slow industry down even further.

The carriers are asking for an increase of $170,000,000 in revenue through higher rates. On pig iron and steel they ask for an increse of 10 per cent with a maximum of 2c. per 100 lb. The Chamber of Commerce of the United States has come out in favor of the increase. Doctor Moley, close friend of the President, has also spoken on behalf of the railroads.

Alloys Industry Code Approved—Other NRA Doings and Undoings

WASHINGTON, Sept. 11.—The NRA has announced approval of a code of fair competition for the alloys industry, effective Sept. 16. Originally, a code was presented by the Chemical Alliance, Inc., for the electrochemical ferroalloy industry as a division of the chemical manufacturing industry and supplementary to that industry's code. Subsequently, the scope of that proposed code was broadened to cover alloys other than those made by the electrochemical processes. Ultimately, the present code was presented by the American Alloy Producers Association, representing over 90 per cent of the known members of the industry and over 90 per cent in volume of production.

CUTTING DIE MANUFACTURING

Deputy Administrator J. G. Cowling has announced that any objection to the proposed $3,750 budget for the support of code administration in the cutting die manufacturing industry for the six months commencing June 18, 1934, must be submitted to Room 4023, Department of Commerce building, prior to Sept. 19. It is proposed that members of the industry contribute $2.50 per employee for the six-month period.

The Code Authority also has asked termination of the exemption granted under paragraph 3, of Administrative Order X-36, which frees a member of any industry or trade from contributing toward the support of any code except that covering his principal line of business. Objections to the above should be similarly filed.

SCRAP IRON AND WASTE MATERIALS

The code authorities for the scrap iron and steel trade, the non-ferrous scrap metal trade, the scrap rubber trade, the waste paper trade and the cotton rag trade which are administrative agencies established under the code of fair competition for the scrap iron, non-ferrous scrap metals and waste materials trade, have jointly made application to the NRA for approval of their budgets and the basis of contribution to the same for code administration by the members of their respective groups.

The total amount of these several codes for the period March 26, 1934, to April 1, 1935, is as follows: For the scrap iron and steel

trade, $50,140; for the non-ferrous scrap metal trade, $56,350; for the scrap rubber trade, $14,490; for the waste paper trade, $68,770; for the cotton rag trade, $368,310.

The proposed basis of contribution to these several budgets is one-twentieth of one per cent of the gross volume of business for the calendar year preceding the date of assessment, with a maximum assessment of $750 and a minimum assessment of $10.

CAST IRON SOIL PIPE

Public hearing on a request by members of the industry for exemption from clauses of the cast iron soil pipe code which establish a maximum work-week for labor and productive machinery, will be conducted by Deputy Administrator W. W. Rose, on Sept. 18, in Room 2062, Department of Commerce building. The companies requesting the exemptions are: A. Weiskittel & Son Co., Baltimore, Md.; Clay-Bailey Mfg. Co., and the Morgan Foundry Co., both of Kansas City; and the National Foundry Co., New York. The code, as approved, restricts the maximum work-week to 27 hr. both for labor and for the operation of productive machinery.

SAW AND STEEL PRODUCTS

A proposed $26,250 budget for the support of code administration for the 15 months commencing March 1, 1934, for the saw and steel products manufacturing industry has been announced. Objections must be submitted to room 4023, Department of Commerce building, prior to Sept. 20. It is proposed that members of the industry contribute 0.3 per cent of the 1933 sales volume.

Any objections also should be filed to the request of the code authority for termination of the exemption granted under paragraph 3, of Administrative Order X-36, which frees members of an industry or trade from the necessity of contributing to the support of a code except that covering their principal line of business.

PUMP MANUFACTURING

Hearing on a proposed uniform method of filing prices under the approved code for the pump manufacturing industry, will be conducted Sept. 26, in room 127, Willard Hotel. The supervisory agency for the industry proposes the following interpretation of Article XIII of the code:

"Current prices, discounts and terms of sale and payment may be filed in two ways: (a) By size of pump or manufacturer's figure number accompanied by complete performance charts or curves for such types, sizes and speeds as defined by the official call for filing prices issued by the supervisory agency. (b) By filing for such types, sizes and speeds, as defined by the official call for filing prices issued by the supervisory agency, the price for individual capacity, head and speed conditions."

CODE AUTHORITIES APPROVED

The National Recovery Administration has approved the method of selecting the personnel of the following code authorities:

Alloy Casting Industry—Chairman, A. W. Daniels, vice-president, American Manganese Steel Co., Chicago Heights, Ill.; H. H. Harris, president, General Alloys Co., Boston; J. D. Corfield, alloy sales manager, Michigan Steel Casting Co., Detroit; C. E. Malley, alloy sales manager, Ohio Steel Foundry Co., Springfield, Ohio; W. B. Sullivan, vice-president and general manager, Michiana Products Corp., Michigan City, Ind.; W. H. Worrilow, president, Lebanon Steel Foundry, Lebanon, Pa., and W. C. Whyte, vice-president, Electro Alloys Co., Elyria, Ohio.

Diesel Engine Manufacturing Industry—Chairman, R. B. McColl, W. H. Harman, De La Vergne Engine Co., Philadelphia; E. B. Pollister, Busch-Sulzer Brothers Diesel Engine Co., St. Louis, and B. B. Williams, Cooper-Bessemer Corpn., Mt. Vernon, Ohio.

Multiple V-Belt Drive Industry—Walter Geist, general representative, Allis-Chalmers Mfg. Co., Milwaukee; J. M. Degnan, manager, Multi-V Belt Drive Sales Division, Worthington Pump & Machinery Corpn., Harrison, N. J.; Walter Siegerist, president, Medart Co., St. Louis; E. N. Carver, vice-president, Dodge Mfg. Co., Mishawaka, Ind.; W. F. Coleman, vice-president, W. A. Jones Foundry & Machine Co., Chicago, and G. O. Rockwood, president, Rockwood Mfg. Co., Indianapolis.

Locomotive Appliance Industry—M. Schiller, vice-president, Superheater Co., 60 East Forty-second Street, New York; Henry Jude, assistant sales manager, Consolidated Ashcroft-Hancock Co., Inc., Chrysler Building, New York; Elliott Curtiss, president, United States Metallic Packing Co., 1234 Hamilton Street, Philadelphia, and G. W. Alcock, assistant secretary, Lima Locomotive Works, Inc., 60 East Forty-second Street, New York.

Flexible Metal Hose and Tubing Industry (subdivision of the fabricated metal products industry)—S. H. Collum, Philadelphia; C. S. Hungerford, Waterbury, Conn.; J. F. P. Farrar, Maywood, Ill.; M. H. Joseph, New York; C. W. Fletcher, Newark, N. J., and J. J. Young, New York.

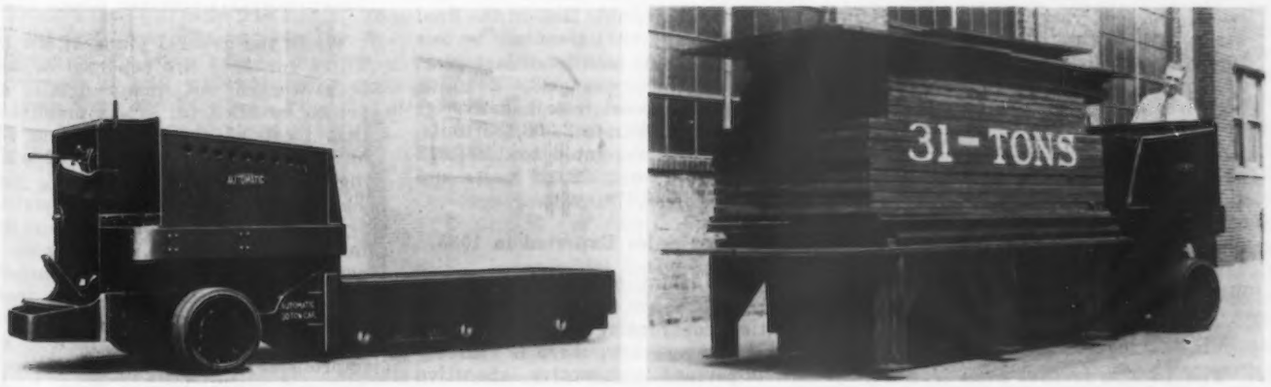
Nickel and Nickel Alloys Industry—John F. Thompson, New York, chairman; Frank L. Driver, Harrison, N. J., vice-chairman; Albert L. Marsh, Detroit; Paul D. Merica, New York; Frederick V. Lindsay, Harrison, N. J., and William D. Little, Detroit.

Tariff Protection to Continue in India

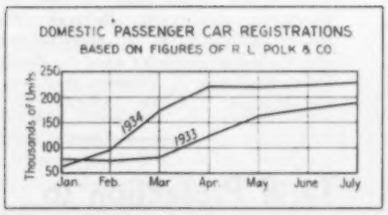
WASHINGTON, Sept. 11.—Continuation of tariff protection for the domestic iron and steel industry for another seven years is recommended by the Indian Tariff Board, according to advices to the Commerce Department from Trade Commissioner E. C. Christopherson, Calcutta.

In a report recently issued the board pointed out that the scheme for protection should embody a provision for modification of import duties if unexpected changes in the conditions of the market render such action necessary. The power to vary the duties under such circumstances should be vested in the Governor-General in Council to be exercised as occasion arises without previous inquiry by the tariff board and without recourse to legislation, the trade commissioner reported.

The tariff board's report recommends that in the case of rails and fishplates the best means of assisting the industry is to make certain that the requirments of the Indian railroads are purchased in India up to the total capacity of the domestic industry at a price not below the fair selling price. Among articles other than rails and fishplates, it is considered that no protective duties are required in the case of structurals (tested) of British manufacture, plates (tested) of British manufacture, semi-finished steel, and steel sleepers. On the remaining classes of steel it is recommended that protective duties should be levied in the form of specific rates.



THIS heavy duty lift truck is said to be the largest yet built. It is a product of the Automatic Transportation Co., and is used for conveying large automotive body dies. The load platform is 40 in. by 96 in. Manual steering is replaced by power steering through a direct current motor.



THIS WEEK ON THE

August Car Production Estimated at 230,000

DETROIT, Sept. 11.

WHILE the automotive outlook leaves much to be desired, it is not so distressing as some believe. Final figures for August production are not yet at hand, but reliable estimates put the total at 245,000 units. This compares with 238,934 units in August of last year and 234,160 units in the same month of 1930. August fell considerably below these levels in 1931 and 1932.

Preliminary estimates for September indicate that assemblies will be around 170,000 units, or somewhat less than the 197,608 units made in September, 1933. This figure, however, is very good in comparison with the 143,212 units built in the same month of 1931 and the 86,492 units in 1932. It is early yet to talk authoritatively about the fourth quarter. Nevertheless it will be surprising if production does not surpass the 285,094 units assembled in the fourth quarter a year ago.

At this vantage point it still appears that October will be the low point for the year. Car manufacturers will begin to get into production of new models about the middle of November, with December promising to bring a considerable expansion in operations. Under the circumstances October is likely to yield an output less than the 138,365 units made in October of last year, but the combined November - December assemblies should easily exceed the 146,729 units produced in those two months in 1933.

Steel Outlook Unimpressive

The trouble is that even if activities in the final quarter are better than they were a year ago, they will be sufficiently curtailed that the steel industry will not benefit greatly. Some tonnage may be placed in the next 30 days and considerably more late in October, but in the aggregate the steel bought then is not likely to be in large enough volume to cause a flurry at the mills. Beginning in November the steel trade probably will feel the stimulus of automotive buying which should gradually raise mill operations, especially in flat-rolled steel, until the spring peak is attained.

While the sales curve today is pointing downward, the automobile industry should derive satisfaction from its showing this year up to Aug. 31. Domestic passenger car and truck registrations, compiled by R. L. Polk & Co., were 1,456,125 units in the first seven months. First returns for August forecast a total of 236,000 units, as against 207,460 in August, 1933. This would raise retail sales from January to August inclusive to 1,692,125 units, only a little short of the 1,739,663 units sold in the entire year of 1933.

If sales should fail to maintain the advantage thus far gained over last year, it is improbable that in the final four months of 1934 they will be less than in the same months of last year. The total then was 623,472 units, which would boost retail deliveries for the entire year to 2,363,135 units. Sales in 1932 amounted to 1,276,812 units, in 1931 to 2,222,025 units and in 1930 to 3,036,678 units.

Increased Sales Expected in 1935

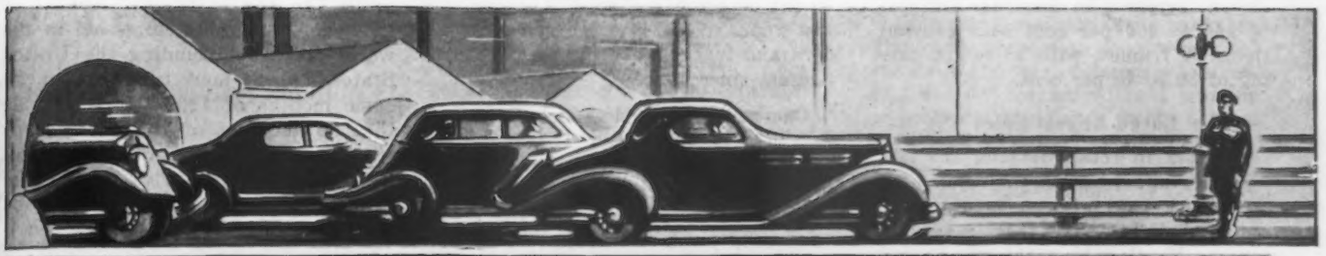
At this point one might inject a note of optimism. With all the difficulties confronting the country in promoting recovery, there is scarcely an important automotive executive who doesn't privately subscribe to the opinion that business in 1935 will be 15 to 20 per cent better than this year. The depression low was reached in 1932 when 1,431,494 cars and trucks were built. Last year an improvement in sales raised production to 1,985,909 units. Assemblies in 1934, conservatively estimated, will be 2,750,000 units. A 20 per cent increase would make the total in 1935 around 3,300,000 units.

The time when car makers will stop production of present models is problematical. The impression is growing that low-price car companies now are engaged in jockeying for position in the 1935 competitive campaign. Ford is closely guarding its plans, meanwhile keeping Chevrolet and Plymouth wondering what is the best thing to do. The latter two had hoped that Ford would unfold its new V-eight in October so that they would know early exactly what competition to expect. Not the least consideration, of course, is the price tag to be attached to the 1935 Ford. But Ford has chosen to delay proceedings, and now it appears that the improved V-eight will not be ready for public inspection until December.

Independents Uncertain About Plans

While the general plans of the Big Three for 1935 are reported to have been worked out, many details are yet to be filled in. It is understood that most of the independents still have before them the task of molding a program for the coming year. They are uncertain about styling, prices, independent springing and how far they dare go in development of new lines in view of serious financial losses the last three or four years. If retail prices again resume a downward trend (an event which is not improbable), independents will be squeezed much harder than larger manufacturers because of the latter's higher volume and lower unit costs.

Packard and Auburn have introduced 1935 models in the last two



ASSEMBLY LINE

By BURNHAM FINNEY
Detroit Editor, THE IRON AGE

weeks, but it is believed that in general appearance neither point the way for what General Motors or Chrysler cars will be like next year. The Packard has always been conservatively designed and its new presentations adhere to this tradition. Auburn's program is said to be largely an effort to clean up materials on hand. The 1935 car differs only slightly from the 1934 line. Major changes are understood to be planned for early spring. Roy Faulkner, who recently returned to Auburn as president, is in the midst of a reorganization which it is hoped will place the Auburn car in a better competitive position than in the last two years.

Of outstanding interest is the long-term contract closed by Eectric Autolite Co. to supply ignition, lighting and starting equipment for all commercial and passenger cars of Chrysler Corpn. The contract includes lamps to be fabricated by the Corcoran Brown Lamp Co., Cincinnati, recently purchased by Electric Autolite. It is said that Electric Autolite has been closely associated for some time with the Chrysler interests. The contract to supply equipment for Chrysler-made cars is looked upon locally as another step by Chrysler toward integration of its manufacturing operations. Much of the equipment to be bought from Electric Autolite has recently been purchased by Chrysler from the Delco Products Division of General Motors. The move means that Chrysler will be contributing less than formerly to the business of one of its two chief rivals, although it still will be buying materials from the AC Spark Plug Co., division of General Motors.

Number of Plants Closed

Automobile manufacturers are inclined to flood the press with news about production and sales when operations are at a high level and to lapse into significant silence when conditions are not so favorable. For this reason official facts and figures made public today are less complete than a month or two ago. However, reliable reports state that Ford's output in September should be about 50,000 to 55,000 units and Chevrolet's 55,000. Plymouth is said to be counting on 20,000 assemblies for this month. Buick is working three days a week, confining its operations to the 40 model. Studebaker, Cadillac-LaSalle, Lincoln and Pierce-Arrow assembly lines were closed last week. Cadillac-LaSalle and Studebaker resumed activities this week. Terraplane-Hudson, Pontiac, Reo, Dodge, Chrysler and DeSoto are working on curtailed schedules.

As the result of a sales drive Dodge dealers made a remarkable record the week ended Sept. 1, selling 9034 vehicles, the best week's sales in eight years. Of that number 2870 were Dodge passenger cars, 3910 Plymouths and 2254 Dodge trucks. Deliveries of commercial cars and trucks were the largest in the company's history. A federal plum dropped into the lap of Fargo Motor Corpn., Chrysler division, the past week when the War Department awarded it 3133 trucks at a cost of $2,596,937. Chevrolet will supply 101 trucks and Reo two. Heretofore this year Chevrolet has received the bulk of the federal business. Ford has been completely excluded because of its refusal to subscribe to NRA.

Briggs Mfg. Co. is in the midst of an expansion program. By Jan. 1 the division manufacturing sheet steel plumbing fixtures will be removed to the company's Hamtramck plant, which has been idle since 1929. The tool and die department has been enlarged by 25 per cent and the press department at the Mack Avenue plant 20 per cent.

Independent Springing for Rear Wheels

The Leaf Spring Institute, together with associated manufacturers, has equipped an experimental car with independent suspension on front and rear wheels, using leaf springs. The front end design is similar to that developed early this year. Compared with independent springing using coil springs, the new system is said to save 50 lb. in weight, to eliminate four bearings, to simplify service problems and to lower production costs. The front end springing unit consists of double transverse springs, one behind the other, with the spring eyes double wrapped. Extending from the frame to the knuckle support above the springs are clevised rods forming a spring and rod parallelogram which results in relatively small track changes in combination with a minimum of camber variation under spring deflections. The leaf springs have progressive spring seats to shorten the effective length of the spring under heavy deflections. The springing system for the rear wheels is similar in construction to that for the front wheels. A special differential housing, mounted on the frame in rubber, supports the rear spindles which are mounted in Timken bearings. The drive is through four universal joints. Either direct action or lever type hydraulic shock absorbers are provided. With the new design it is possible to decrease the unsprung weight of the rear system 100 lb. and of the front system 40 lb., making a total of 140 lb. of unsprung weight that becomes sprung weight with improved riding characteristics as a result.

New Type Frame Developed

With the exception of the power plant and body, the car is new throughout. Of special interest is a double wish-bone tubular steel frame developed by Midland Steel Products Co. The front and rear of the frame are shaped like a wish-bone to support the engine and differential and are joined in the center by a tubular section. The frame is fabricated by welding two full length rails extending from bumper to bumper in the center tubular section. Both wish-bone ends are made full box section by the use of welded inserts. The front cross member is also full box section and supports the front springs and divided tie rods. Two cross members, one at the rear of the front Y and one at the front of the rear Y, serve as body, fender and rear engine supports. Tests of this frame have

shown increases in torsional stiffness of 140 to 400 per cent over conventional X frames, with a weight saving of 30 to 40 per cent.

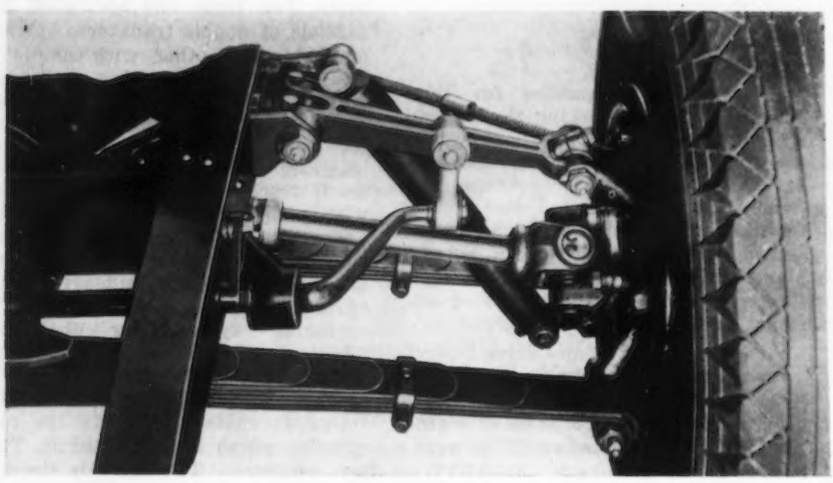
Large August Sales

A spurt in retail demand the last week in August carried the volume for the month to a greater height than anticipated by some car manufacturers. Ford's sales within the United States were 72,000 cars and trucks, thus exceeding July's record and reversing the usual seasonal trend. It is especially significant that cash sales formed a large percentage of the total. Ford's world sales last month amounted to 88,800 units, or more than 7000 units over the estimates and 40 per cent greater than in August of last year. Sales of Ford commercial cars and trucks were the best of any August since 1929.

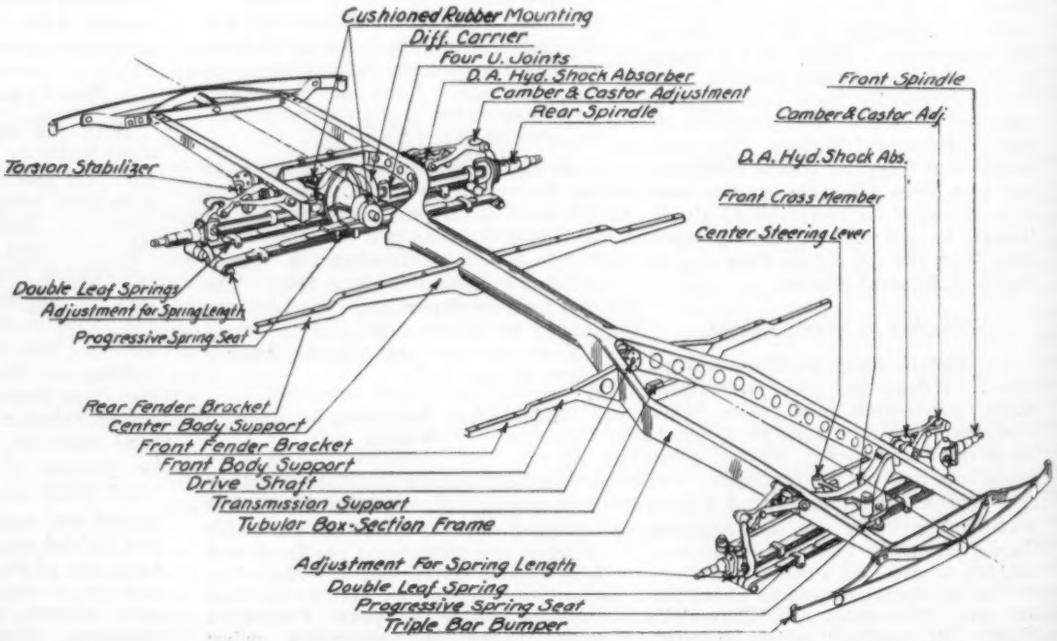
Chevrolet's assemblies in August are reported to have been 74,437 units, raising the output for the first eight months of this year to 692,477 units. This figure exceeds by 66,200 the 1933 12 months' total. Chevrolet's domestic retail sales last month ran ahead of domestic production.

August sales of General Motors to dealers in the United States and Canada plus overseas shipments totaled 109,278 units, compared with 97,614 in the same month a year ago. Sales in July amounted to 134,324 units. In the first eight months of this year General Motors sold in the world markets, including the United States, 290,724 more cars than in the same months of 1933. It is notable that 62 per cent of this increase or 181,685 units consisted of export business, signifying a revival of demand in other countries for American-built automobiles.

Since awarding a contract for equipment for its cylinder block line, Packard has taken no further action toward purchasing machine tools for its lighter eight. However, indications are that it will make the transmission and other parts which it has been considering buying from outside sources. It is now believed to be the aim of the Packard management to manufacture just as much of the new car as possible in the Packard plant. Ford is reported to be inquiring for prices on the building of special machines designed by its own engineers. An outstate car manufacturer is said to be in the preliminary stages of designing a new passenger car engine which if contemplated plans go through will necessitate the purchase of a substantial amount of machine tool equipment. While a little more tool and die work is being placed, the bulk of it for new models still is being held in abeyance. Shops outside Michigan are just as devoid of orders as many Detroit plants, thus giving the lie to reports that car makers have secretly distributed large orders around the country. Ford is about to place some tool and die work for its 1935 car.



View of rear end independent springing system using leaf springs developed by Leaf Spring Institute and associated manufacturers. The institute's new design calls for independent springing of all four wheels. Note the direct acting shock absorber, torsional dampener and driveshaft which is provided with two universal joints on each side of the differential.



New type of independent springing using leaf springs for both front and rear ends of automobiles has been developed by Leaf Spring Institute, Detroit, and associated manufacturers. A double wishbone tubular steel frame also has been developed. Both the new springing system and the new frame are incorporated in an experimental car recently built.

▲▲▲ LETTERS TO THE EDITOR ▲▲▲

Glass House Dwellers Shouldn't Throw Bricks

Editor The Iron Age:

THE article in your Sept. 6 issue of THE IRON AGE by Kenneth Stillman is thoroughly sound and goes to the root of the matter. It is the type of answer that should carry weight in a Court of Justice, but it is an open question if a majority of voters care to analyze facts or admit the validity of sound argument in the presence of prejudice or appeals to sympathy. The attack on industry is a political affair, and its success depends upon distortion of fact with emphasis upon evils that were really brought about by political incompetency. There is need to bring home to the average citizen that most of our troubles were caused by failure of government to regulate, and that means the legislators and administrators who had ample powers if they had chosen to use them. They failed to apply to "Big Business," promoters, utility magnates and investment bankers, the obvious controls within their reach and because they failed to function, the dire result of their incompetence is being laid upon the doorstep of business and industry as a whole.

The "New Deal" is an admission that government did not control, and the same breed of political opportunists who admit failure under the "old deal" to regulate the doings of a few pirates are announcing themselves competent to regulate all business from the gigantic steel industry to the cigar stand around the corner. And not only to regulate but to operate. If they fell down on the job when the problem was simple, is it reasonable to suppose that they will do any better when the problem is no less than regulation plus actual operation of most of the business and industry of the country? Is there not convincing evidence that right now they are hopelessly tangled and confused in attempting to coordinate and control the bureaucratic machine itself which they set up to coordinate and control the rest of the U. S.?

The whole trouble is simply failure of those supposed to be active in the evolution of government and human relations to keep pace with the evolution of science and industry and business. These men are our legislators, Governors and administrators. If they had been strong characters and had given proper attention to research and honest endeavor in the science of government and if they had disciplined the few "rugged individuals" who exploited and betrayed industry and business, there would have been no occasion for experimenting with new types of government machinery. The old tools were equal to the job. The operators lacked the knowledge, the skill and the inclination to use them. No wonder they are lost in an expanded government plant filled with complicated modern equipment that has not passed the experimental stage, and that is calling for ten times the payroll to realize 50% of normal production. They failed in the field of government and human relations because they did not fit themselves for the job nor contribute to its progress. They now propose to show what they can do in the way of running business and industry—again without training or technical experience or the urge of individual initiative.

Those of us in the machinery business know how common it is for an incompetent mechanic to blame a machine for his failure to operate it. It is a mechanical trick not unknown to politicians.

L. G. MERRITT,
Merritt Engineering Sales Co., Inc.

Bids For Navy, Canal And Interior Dept.

THE Bureau of Supplies and Accounts, Navy Department, will open bids Sept. 25 on 1,367,550 ft. of electrical cable of various types. This is one of the largest requirements of electrical cable put out in recent years.

Panama Canal will open bids Sept. 27 for 54,720 ft. of wrought iron or steel galvanized and black pipe. The schedule also involves fair-sized tonnages of sheets and plates and 61 tons of steel bars.

On Sept. 14 the Interior Department will open bids on 1650 spools of barbed wire, 750 rolls of fence and 58 kegs of staples. On each item the department carries a 90-day reservation to purchase additional supplies, giving it the right to purchase at bid prices 2000 additional spools of barbed wire, 1000 additional rolls of fence and 150 additional kegs of staples.

EXTRA long slide adjustment is featured on this new line of high speed, deep throat punch type presses, announced by Cleveland Punch & Shear Works Co., Cleveland. Press illustrated is of the flywheel type with direct-connected motor drive. Also furnished in geared type with throat depths to suit requirements. Combinations of two presses of equal capacity are made, giving double end machines with a single drive.

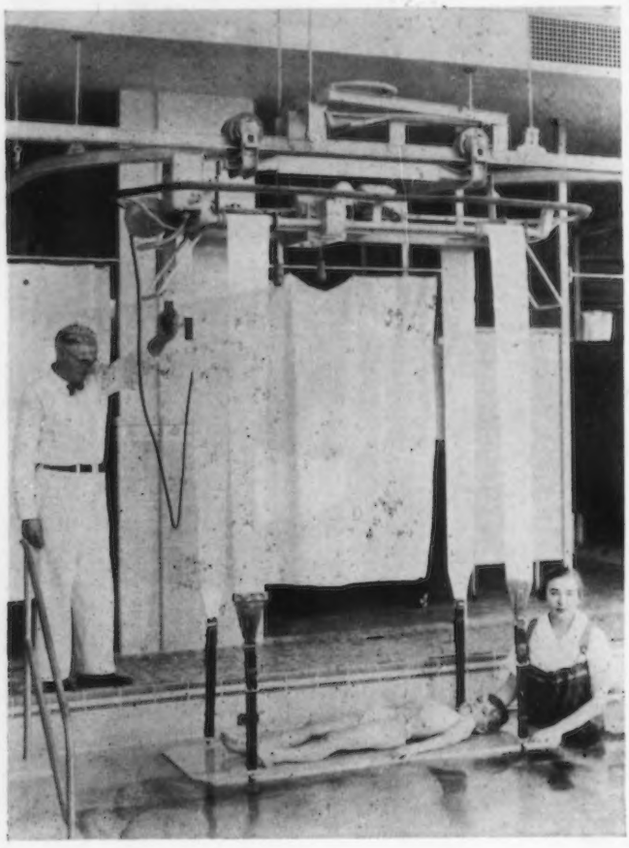
What Is The Gold Standard?

By A. W. FORBES

ACCORDING to definition, a standard is an article with which other articles are compared to determine their accuracy. In the case of money on the gold standard, the article is a definite amount of gold. If a piece of paper money will buy just as much goods as the amount of gold specified by it, and if it does so continuously, the paper money is said to be on the gold standard. The usual way in which a government keeps the value of a paper dollar the same as that of a gold dollar is to offer to give the gold to anyone who offers the paper for it.

That sounds very simple. All that is meant by money on the gold standard is that it is just as good as gold to buy things with, and that it continues to be just as good as the same amount of gold under all conditions. But there is one difficulty. Money is a measure of value, not of weight. Gold changes in value according to supply and demand in the same way as any other article. So to get the real basis for the standard of money, we should inquire as to what fixes the value of gold. It has been found that the changes in the value of gold from year to year are determined by the value of paper money. So in putting money on this so-called gold standard we have not fixed the value of the paper money. We have more nearly regulated the price of gold on a paper basis. Instead of saying that our paper money was on a gold standard, it would be more correct to say that our gold money was on a paper standard. The object of this article is to explain how this comes about.

The idea of the value of money can be most easily seen in the case of extreme inflation, such as that of Germany. Billions of marks were printed, and the result was that the marks became almost worthless. In this case it is easy to see that the value of each mark was determined by the number of marks printed: the more marks, the less each was worth. But Germany was not on the gold standard at that time. It would be better to consider our own country from the years 1914 to 1920. During nearly all of this time the Government offered to give a gold dollar to anyone who gave it a paper one, and yet there occurred here the same thing as in Germany on a much smaller scale.



THE unusual use of an electric hoist and monorail system in a hospital as an aid in promoting the recovery of paralyzed children is found in the recently dedicated Kate Page Crutcher Orthopedic Building of Children's Hospital, Los Angeles. The equipment includes a standard Cleveland Tramrail and fittings and a lowering device designated as a "Gurney." It is used in transporting children suffering from infantile paralysis from one portion of the building to another and to a pool, the special function of the Gurney being for lowering a child into the pool. Children are immersed, because they naturally play when in the water. The water makes their limbs more buoyant and permits them to exercise more readily than when out of the water, and it is claimed that convalescence is brought about in much less time than under normal conditions of exercise. Four hoists for this purpose are in use in Los Angeles, two electrically operated and two hand operated units.

Between 1914 and 1920 our Government printed a large amount of new paper money, so that the amount in circulation outside of the banks increased about 140 per cent. At the same time average prices increased about 150 per cent. We call that an increase in prices, but we should look at it from the other side. A dollar was not worth as much to us because we could not do as much with the dollar. The value of the dollar had gone down just as we saw it do in Germany. It had not gone down as far, but it was on the same route. And as we were on the gold standard, the drop in the value of the paper money forced the price of gold down with it.

Checks Are the Largest Factor

Paper money is a greater part of the real standard for our money values than gold, but there is an even greater part—bank checks. In 1929 deposits in our banks were over fifteen times as great as money in circulation outside of the banks. And the checks given on these banks do the same work as money. If the quantity of money is of importance in determining the value of the money, the quantity of these checks must be of much more importance because there are so many more. Between 1914 and 1920 we find that checks sent through the clearing houses increased by 180 per cent. Of course, these figures do not agree exactly, for there are other things that determine the value of money besides the amount in circulation and the amount of bank checks. But in these figures we see the capricious nature of our money system. The real standard on which the value of the money is based is determined by every person who writes a check or carries money in his pocket. As long as gold and paper are tied together, gold must follow the paper, because the paper is so many times as great in amount.

Gold has one real function under the so-called gold standard. It serves to tie the currencies of the world together. As long as the currency in each country was tied to gold, and the gold was passing freely between all the countries, the currencies of all the countries continued nearly at par. Then the real standard was the total paper of the world. As the nations went off this standard, either completely and openly, or, as the United States is now doing, by placing upon its operation such restrictions that it cannot do its work, nothing was left to tie the currencies of the world together and each went its own way. Today the gold in the United States Treasury may have a psychological effect on some. It may be used for experimentation in international finance. But as a standard for our money, there is no more in the fiction of a gold standard than if the treasury took empty boxes and marked them with the word gold.

Expansion in Steel Bookings Is Not Impressive

Ingot Rate Rises Only a Half a Point to 19½ Per Cent—Government Will Buy 165,000 Tons of Fencing

THE second week of September has brought out further moderate expansion of iron and steel bookings, especially from miscellaneous sources, but nothing resembling a definite upward trend in buying is yet apparent.

Steel ingot production has risen two points to 11 per cent at Pittsburgh, three points to 23 per cent in the Valleys and one point to 24 per cent at Chicago, but these gains were due mainly to an accumulation of orders during the shutdowns of Labor Day week and have been partly offset by losses of 11 points to 15 per cent at Cleveland, three points to 21 per cent in the Wheeling district and two points to 16 per cent in the Philadelphia area. The national average, at 19½ per cent, compares with 19 per cent in the two preceding weeks.

WHILE there is growing evidence of depletion of consumer stocks, replenishment buying is still characterized by extreme caution, both because of business uncertainty and the protection which the code affords against price advances. Demand from the largest sources of steel business—the railroads, the automobile industry and construction—is now limited mainly to the last of the three, which is still sustained by Federal expenditures.

Of foremost interest among Government-sponsored projects is a prospective purchase by the Forest Service, Department of Agriculture, of approximately 100,000 miles of wire fencing, calling for 165,000 tons of steel, for the 1000-mile long, 100-mile wide shelter belt which is to extend from Canada to the Mexican border. The first inquiry, calling for 25,000 tons, will be issued by the Lincoln, Neb., offices of the Forest Service in October.

Pending structural steel work, largely of a public character, has been swelled by fresh inquiries for 16,000 tons. Structural awards, at 8900 tons, compare with 9200 tons in the preceding week. Plate lettings exceed 1500 tons.

Acceleration of releases against old PWA awards and the expediting of new contracts of that category have increased activity among cast iron pipe foundries in the South.

The Administration's home modernization program is being watched for stimulating effects on the demand for merchant steel pipe. Steel line pipe remains dormant. Although higher coal prices have brought natural gas into greater favor, private capital for the financing of new lines is lacking. Where the construction of lines is actually being undertaken used pipe, dug up from old lines, is commonly employed.

TIN PLATE production continues at a strong 40 per cent, being supported by an influx of orders from South America and the Orient and indirectly by specifications for the Federal meat packing program. Export business has been stimulated for some time by a succession of price advances that has attended the establishment of an international pool. The world agreement is now in full effect, with all prices quoted c.i.f. foreign port instead of f.a.s. port of shipment. Under the new arrangement f.o.b. mill prices will vary somewhat after deduction of transportation costs, but the present American export price approximates $4.33 per 100-lb. base box, Pittsburgh. A price of $3.60 was current as recently as last April. Our London cable reports that further depreciation of the pound sterling is aiding British export trade in iron and steel and checking foreign competition in the domestic market.

PRODUCTION of railroad steel is steadily approaching the vanishing point, but further Federal aid for maintenance of way and equipment expenditures is said to be in sight. Lending weight to this report is the allocation of PWA funds to the Lehigh Valley for the construction of 1900 freight cars in its own shops and the purchase of three Diesel electric switching locomotives. The Pennsylvania is in the market for 10 to 50 electric locomotives.

Automobile demand for steel remains light, but both sales and production by motor car makers in August exceeded expectations.

THE IRON AGE scrap composite, influenced by a 25c. per ton recession at Chicago, has dropped from $9.75 to $9.67 a ton, a new low for the year. The finished steel and pig iron composites are unchanged at 2.124c. a lb. and $17.90 a ton. The intimation from Washington that all forms of price control will be eliminated from codes has been received with mixed feelings by the steel industry. While the preponderance of opinion is that the open price system provides a needed stabilizing influence, there is dissatisfaction with its inflexibility and with various roundabout methods employed to evade it.

▲▲▲ A Comparison of Prices ▲▲▲

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

	Sept. 11, 1934	Sept. 5, 1934	Aug. 14, 1934	Sept. 12, 1933
Per Gross Ton:				
No. 2 fdy., Philadelphia	$20.26	$20.26	$20.26	$18.34
No. 2, Valley furnace	18.50	18.50	18.50	17.50
No. 2 Southern, Cin'ti	19.13	19.13	19.13	18.23
No. 2, Birmingham†	14.50	14.50	14.50	13.50
No. 2 foundry, Chicago*	18.50	18.50	18.50	17.50
Basic, del'd eastern Pa.	19.76	19.76	19.76	17.84
Basic, Valley furnace	18.00	18.00	18.00	17.00
Valley Bessemer, del'd P'gh	20.76	20.76	20.76	19.89
Malleable, Chicago*	18.50	18.50	18.50	17.50
Malleable, Valley	18.50	18.50	18.50	17.50
L. S. charcoal, Chicago	24.04	24.04	24.04	23.67
Ferromanganese, sea'd. carlots	85.00	85.00	85.00	82.00

†This quotation is for delivery in South: in the North prices are 38c. a ton under delivered quotations from nearest Northern furnace.
*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Rails, Billets, etc.

Per Gross Ton:				
Rails, heavy, at mill	$36.37½	$36.37½	$36.37½	$40.00
Light rails, Pittsburgh	35.00	35.00	35.00	34.00
Rerolling billets, Pittsburgh	27.00	27.00	27.00	26.00
Sheet bars, Pittsburgh	28.00	28.00	28.00	26.00
Slabs, Pittsburgh	27.00	27.00	27.00	26.00
Forging billets, Pittsburgh	32.00	32.00	32.00	31.00
Wire rods, Pittsburgh	38.00	38.00	38.00	35.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.70	1.70	1.70	1.60

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.80	1.80	1.80	1.60
Bars, Chicago	1.85	1.85	1.85	1.65
Bars, Cleveland	1.85	1.85	1.85	1.65
Bars, New York	2.13	2.13	2.13	1.95
Plates, Pittsburgh	1.80	1.80	1.80	1.60
Plates, Chicago	1.85	1.85	1.85	1.65
Plates, New York	2.08	2.08	2.08	1.898
Structural shapes, P'gh	1.80	1.80	1.80	1.60
Structural shapes, Chicago	1.85	1.85	1.85	1.65
Structural shapes, New York	2.05¼	2.05¼	2.05¼	1.86775
Cold-finished bars, P'gh	2.10	2.10	2.10	1.95
Hot-rolled strips, P'gh.	1.85	1.85	1.85	1.65
Cold-rolled strips, P'gh	2.60	2.60	2.60	2.25

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.40	2.40	2.40	2.25
Hot-rolled annealed sheets, No. 24, Gary	2.50	2.50	2.50	2.35
Sheets, galv., No. 24, P'gh	3.10	3.10	3.10	2.85
Sheets, galv., No. 24, Gary	3.20	3.20	3.20	2.95
Hot-rolled sheets, No. 10, P'gh	1.85	1.85	1.85	1.65
Hot-rolled sheets, No. 10, Gary	1.95	1.95	1.95	1.75
Wire nails, Pittsburgh	2.60	2.60	2.60	2.10
Wire nails, Chicago dist. mill	2.65	2.65	2.65	2.15
Plain wire, Pittsburgh	2.30	2.30	2.30	2.10
Plain wire, Chicago dist. mill	2.35	2.35	2.35	2.15
Barbed wire, galv., P'gh	3.00	3.00	3.00	2.60
Barbed wire, galv., Chicago dist. mill	3.05	3.05	3.05	2.65
Tin plate, 100 lb. box, P'gh.	$5.25	$5.25	$5.25	$4.65

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh	$10.75	$10.75	$11.25	$13.00
Heavy melting steel, Phila.	9.75	9.75	10.00	11.25
Heavy melting steel, Ch'go	8.50	8.75	9.25	10.00
Carwheels, Chicago	9.50	9.50	9.50	10.50
Carwheels, Philadelphia	11.25	11.25	11.25	12.75
No. 1 cast, Pittsburgh	11.75	11.75	12.25	11.75
No. 1 cast, Philadelphia	11.75	11.75	11.75	12.50
No. 1 cast, Ch'go, (net ton)	8.00	8.00	8.00	10.00
No. 1 RR. wrot., Phila.	11.25	11.25	11.25	12.00
No. 1 RR. wrot., Ch'go (net)	6.75	7.25	7.25	9.00

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$3.85	$3.85	$3.85	$2.50
Foundry coke, prompt	4.60	4.60	4.60	3.25

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, refinery‡	8.75	8.75	8.75	8.75
Lake copper, New York‡	9.12½	9.12½	9.12½	9.12½
Tin (Straits), New York	51.37½	51.55	52.90	46.00
Zinc, East St. Louis	4.15	4.20	4.30	4.65
Zinc, New York	4.50	4.55	4.65	5.02
Lead, St. Louis	3.55	3.60	3.60	4.35
Lead, New York	3.70	3.75	3.75	4.50
Antimony (Asiatic), N. Y.	8.62½	8.62½	8.50	6.75

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables. ‡Blue Eagle copper.

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▲▲▲ The Iron Age Composite Prices ▲▲▲

	Finished Steel	Pig Iron	Steel Scrap
Sept. 11, 1934	2.124c. a Lb.	$17.90 a Gross Ton	$9.67 a Gross Ton
One week ago	2.124c.	17.90	9.75
One month ago	2.124c.	17.90	10.17
One year ago	1.959c.	16.71	11.42
	Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products make 85 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	High	Low	High	Low	High	Low
1934	2.199c., April 24	2.008c., Jan. 2	$17.90, May 1	$16.90, Jan. 27	$13.00, Mar. 13	$9.67, Sept. 11
1933	2.015c., Oct. 3	1.867c., April 18	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.977c., Oct. 4	1.926c., Feb. 2	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.42, July 5
1931	2.037c., Jan. 13	1.945c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.273c., Jan. 7	2.018c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.317c., April 2	2.273c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.286c., Dec. 11	2.217c., July 17	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.402c., Jan. 4	2.212c., Nov. 1	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22

Output Up in Pittsburgh And Valley Districts

Wheeling Rate, However, Declines—Gains in Mill Bookings Not Impressive—Tin Plate Releases Show Staying Powers

PITTSBURGH, Sept. 11. — Raw steel output in the Pittsburgh district this week is two points higher at 11 per cent. Operations in the Valleys and nearby northern Ohio mills have risen three points to 23 per cent. In the Wheeling district production has fallen three points to 21 per cent.

The increased production in the Pittsburgh and Valley districts can be traced largely to rolling of orders that had accumulated during shutdowns in the Labor Day week. A trace of improvement is discernible in daily bookings for certain forms of finished steel, but miscellaneous orders since Sept. 1 have by no means indicated a definite upward trend in buying. With the possible exception of structural and reinforcing steel, backlogs are probably at the lowest point this year, and producers are finding it difficult to swell present order books sufficiently to assure rolling schedules more than a few days ahead.

Tin plate continues to defy seasonal expectations, but the sustained rate of production of 40 per cent is chiefly attributable to export orders and indirectly to specifications for the Federal meat packing program. General tin plate specifications are declining, and a seasonal drop in output is considered imminent. Sheet and strip operations are up about two to three points this week to slightly under 20 per cent. Seamless tube mills and wire mills are operating irregularly. The local rail mill is inactive this week.

Pig Iron

Resumption of foundry operations after shutdowns during the Labor Day week is expected to drive in a few carlot orders. Large users are still drawing from stock piles, and no major buying is believed to be imminent this quarter. Ingot mold makers are suffering from low steel operations and are not important at present in the local pig iron market. Despite the general lack of demand, prices are firm.

Semi-Finished Steel

Aggregate demand for semi-finished steel is declining. Although a slight improvement in strip and sheet mill schedules is reported this week, there is yet no occasion to increase specifications for slabs and sheet bars, since semi-finished stocks at most detached mills are fairly ample. Sheet bar shipments to non-integrated tin plate mills are abating. Fourth quarter contracting has not thus far been noticeable, and, with maximum price protection already assured for that period, buying is expected to be restricted to running requirements.

Rails and Track Accessories

The possible availability of additional Federal funds may revive buying by the carriers before the close of the year. Up to the present, however, no definite program has been shaped. It is considered likely that additional Federal funds will be proffered the carriers to stimulate labor and industrial activity. How the carriers would apply new funds is problematical, but undoubtedly a large share of new purchasing power would be used for replacing worn-out rolling stock and to take care of considerable deferred maintenance. In the meantime, producers here are suffering from lack of orders.

Bars

Bookings since the beginning of the month indicate no increase in demand. The principal consuming groups apparently are satisfying present requirements from inventories and hesitate to enter further commitments in the face of general business uncertainties. The automotive industry is still not an important outlet this quarter, but improvement in specifications from that source is expected some time this month.

Reinforced Steel

Extras on billet steel reinforcing are unchanged in the new set-up of iron and steel extras under the code. Specifications on the spillway for the Fort Peck, Mont., dam reveal a total requirement of 18,000 tons, which will be let on Sept. 24. A large aggregate amount of new reinforcing steel requirements are in the making, but a large part of the projected work is still in the hands of architects. Recent lettings of numerous small post offices specified only minor quantities of rail steel reinforcing.

Cold-Finished Steel Bars

Specifications from motor car makers and parts manufacturers are slightly improved. Otherwise demand shows no trend. Seasonal improvement in demand from agricultural implement makers is due next month. Replenishment buying by jobbers thus far in September has been on a very meager scale.

Steel Sheet Piling

Bids will be taken on Oct. 2 on about 1500 tons of permanent steel piling and an additional tonnage of temporary piling for dam No. 6 over the Mississippi River at Trempealeau, Wis. The only important change in steel piling extras in the new set-up covers an additional charge of $2 a ton for assembling piling at the mill, in not more than two pairs. The base price of 2.15c., Pittsburgh, is applicable to shipments through December.

Plates and Shapes

On Oct. 1 new plate extras, ranging from 10c. to $1 per 100 lb., will become effective on lots of 5999 lb. down to less than 999 lb. Additional extras will be assessed on tolerances for dimension and workmanship. Activity in the plate market is extremely dull. Mill backlogs of plate orders for railroad equipment construction are generally near completion. Barge yards and tank projects are negligible factors. The Navy construction program has not thus far brought in plate tonnage to this district. Structural steel mills here report a sharp drop in new inquiries, with the only important item this week covering 8000 tons for a parcel post building at Boston. Recent awards are featureless.

Wire Products

Accumulations of orders at some mills that have been inactive for the past week have not been sufficient to warrant resumption. Schedules at other mills continue on a greatly reduced basis, with no bright prospects for heavier schedules in sight. Manufacturers' wire and spring wire are notably in poor demand, owing to the absence of important specifications from automotive centers. A fair interest in wire fencing, nails and cotton ties continues in the Southeast.

Tubular Products

Projected line projects continue to fade out so far as pipe producers are concerned, since the trend in pipe line construction appears to be toward the utilization and reconditioning of old pipe lines. The latest instance of this kind is the proposed 70-mile, 12-in. natural gas line in the Southwest, planned by Lone Star Gas Co., Dallas, Texas, which will use reconditioned pipe that has been underground in

other districts. Standard pipe is relatively inactive, and producers have not yet made any definite plans for meeting the demand which is expected to be created in the extensive home rehabilitation program. Mechanical tubing continues to suffer from restricted automotive business, while seamless commercial boiler tubes and locomotive boiler tubes are moving in occasional carlots.

Sheets

A barely perceptible increase in sheet orders is reported by leading sellers. The extent of the improvement is perhaps best measured by a two or three-point advance in sheet mill operations this week to about 19 per cent. The betterment is not traceable to any single source, but represents miscellaneous business. Automotive tonnage does not figure heavily in daily bookings. Demand for galvanized sheets is livelier.

Tin Plate

A welcome influx of export orders for delivery to South America and the Orient, coupled with additional specifications indirectly sponsored by the Federal meat packing activities, has held tin plate operations at a strong 40 per cent. General specifications, however, continue to decline, and unless unexpected support continues from other sources, rolling schedules will soon be revised downward.

Strip Steel

Orders in one or two cases have increased to a point where resumption of rolling is permitted this week. Miscellaneous demand accounts for the bulk of current tonnage, with automotive specifications still lagging. Orders from radio manufacturers are slightly heavier. The present Pittsburgh bases of 1.85c. for hot-rolled strips and 2.60c. for cold-rolled strips are holding.

Warehouse Business

Specifications for galvanized and black sheets are improved. The new quantity extras to become generally effective on mill orders on Oct. 1 are expected to divert small-lot orders on plates and shapes to warehouse trade.

Coke and Coal

Moderate stocking of heating coke by dealers comprises the chief activity in this market. General business uncertainty and lack of credit is hampering seasonal dealer activity in coke considerably. Some stimulus to the present market is offered by movement of beehive coke to Chile. Steam sizes of bituminous coal and slack are plentiful and difficult to move. Prices are unchanged.

Scrap

The decline in scrap prices appears to have been checked temporarily, with all quotations remaining nominally unchanged in the absence of transactions. While definite information is not available concerning disposition of scrap on the last Pennsylvania Railroad list, it is reported that the No. 1 heavy melting steel was sold at $10.75 to $11.25, delivered. Continued suspension of shipments to an independent mill has softened machine shop turnings.

Valley Operations Stage Moderate Recovery, But Buying Lags

YOUNGSTOWN, Sept. 11.—While Valley steel production has staged a moderate recovery from the Labor Day slump, bookings have shown only a trace of improvement since the holiday. The rise in output this week is therefore due almost entirely to the additional working day. Only one or two additional openhearths will be added to the number that were in operation at various plants before the holiday recession. The Republic Steel Corpn. has resumed operation of another blast furnace, making five active stacks in the Shenango and Mahoning Valleys.

Labor and political uncertainties at present block the path to normal fall improvement. The timing of the textile strike at this season has tended to defeat hopes for a broad pick-up in steel buying for some time. Delays in automobile production on new models and lower output on present cars are exerting particular influence on Valley steel mill schedules. Miscellaneous orders are coming in more frequently than in August, but there are no clear evidences that replenishment buying is getting under way.

Lacking vigorous support from consuming lines, finishing mills are adhering to generally restricted schedules. Sheet and strip units are operating at around 20 per cent, with no early increases in rolling in sight. Tin plate production has held its own, but is expected momentarily to begin a seasonal decline.

Pipe mills in this district are being occupied only moderately with small-lot orders for oil country goods, mostly for immediate consumption. Jobbers are coming into the market more regularly for fill-in lots to round out stocks depleted in the past two months.

Line pipe is a dormant item. The easing of credit would, it is pointed out, possibly create a substantial demand for gas line pipe. Fuel costs have risen sharply since codification of the bituminous coal industry, and natural gas, which is preferred generally for domestic and industrial use, is now in increasing favor. The piping of natural gas to consuming centers, however, has not increased to any extent, chiefly owing to capital limitations. The paucity of funds has similarly depressed potential line pipe tonnage from other directions. In some cases, old lines are being dug up and used in connection with rather small requirements of new pipe.

Except for a slight increase in minimum carlot orders, the pig iron market is featureless. Quarterly contracting, at least for the remainder of this year, will give way to spot buying, since maximum prices are established under the code until Jan. 1. Scrap offers no contrast to the Valley steel markets. Suspensions to one mill are still in force, and no new buying of consequence has been reported in more than a month. No. 1 heavy melting steel is soft at $11, delivered.

Bridge Bids Feature St. Louis Market

ST. LOUIS, Sept. 11.—Low bidders on the vehicular bridge over the Missouri River at Washington, Mo., follow: superstructure, requiring 2850 tons of structural steel and 162 tons of reinforcing bars, McClintic-Marshall Corpn., $336,000; substructure, requiring 167 tons of reinforcing bars, $212,000, Missouri Valley Bridge & Iron Co., Leavenworth, Kans.

The improvement noted last week in specifications against contracts for structural shapes, was short-lived, this and other finished steel items being quiet. Railroads have given no indications as to their requirements for rails for 1935. Warehouse business continues its downward trend.

The scrap market continues at a standstill. None of the mills is buying, and dealers are holding on to the little scrap they have. Prices are nominally unchanged. Railroad lists: Missouri Pacific, 60 carloads; St. Louis-Southwestern, 30 carloads.

Stove foundries in the St. Louis industrial district have been operating on improved schedules since Labor Day, the cooler weather stimulating the movement of finished products. Otherwise there is no change in the melt of pig iron.

SCHLOSSER BROTHERS, 1926 Venango Street, Philadelphia, announce a change in firm name to Schlosser Manufacturing Co., effective Sept. 1. The company will continue at the above address.

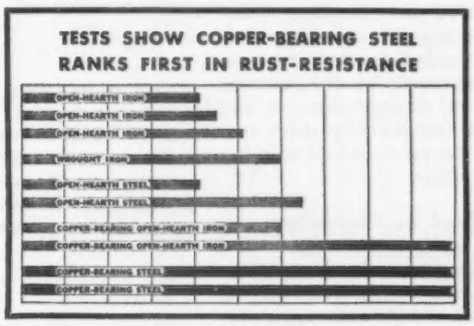
SIGN OF RAIN?

THE delusions of one generation are the jests of the next.

Today we smile at the belief that a cat washing its face is a sign of rain. Yet other fallacies persist—such as the notion that sheets that are rust-resisting must necessarily be expensive.

The American Society for Testing Materials has settled the question of the comparative rust-resisting qualities of sheets scientifically. The society made a series of tests in which sheets of all commercial types of steel and iron were exposed to the weather over a period of years. Some of the costlier sheets tested were quickly rusted through, while a relatively inexpensive material, copper-bearing steel, was found to outrank all the other materials, regardless of cost, in ability to withstand rust.

Copper-bearing steel, inexpensive yet durable, is the material of which Beth-Cu-Loy Sheets are made. When you specify Beth-Cu-Loy for rust-exposed applications, you get sheets that not only are made of the least costly rust-resisting material, but embody the craftsmanship that goes into every Bethlehem product.



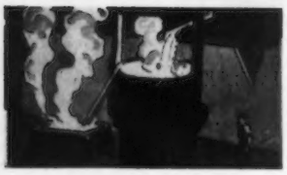
This chart summarizes results of A.S.T.M. tests at Brunot Island, near Pittsburgh, Pa. These tests, like those at other locations, show the superior resistance to atmospheric corrosion of copper-bearing steel, the material of which Beth-Cu-Loy Sheets are made.

BETHLEHEM STEEL COMPANY
General Offices: BETHLEHEM, PA.

BETHLEHEM STEEL

BETH-CU-LOY SHEETS

Production Gains Slightly In the Chicago District



But Convincing Signs of an Improvement in Demand Are Lacking—Heavy Melting Scrap Drops 25c a Ton

CHICAGO, Sept. 11. — Confusion and uncertainty still rule in the Chicago iron and steel market. Ingot output has gained a fraction of a point to a shade under 24 per cent of capacity but the upward trend has not been general, some mills having curtailed output while others have advanced slightly.

Heavy melting steel has dropped another 25c. a ton to $8.75 at the top, and the market remains in a weakened condition.

There is not a single industry associated with the metals that can by this time claim definite signs of a fall pick-up in business, despite the fact that some of them should have noted the change about three weeks ago. The farm implement group is nibbling as though it might soon do something, but it has been known to do this before only to have its program settle back to winter manufacturing designed to spread employment and to build stocks of equipment that are expected to move in the spring.

Sales and specifications in finished steel hold at the low average of recent weeks, and inquiries do not point to expansion. A few pig iron contracts have been placed, but these are usually the result of unwillingness to undergo the bother of ordering frequently. Releases of steel for automobile frames will be forthcoming as soon as all design changes are established in conformity with the requirements for new models.

Pig Iron

With one-third of September now past there is still no indication of a pick-up in demand. In fact, shipments so far this month are running slightly behind the August rate. Although there is little incentive to contract, a few forward commitments have been made more as a matter of convenience than because of a desire to cover forward needs. Two merchant stacks remain lighted, but shipments must soon improve if both are to remain active.

Cast Iron Pipe

The outlook is much improved because of Government spending. Michigan City, Ind., has taken bids on a $600,000 filter plant and contractors are preparing to enter estimates on a sewage disposal plant at Cedar Rapids, Iowa. Shipments of cast iron pipe are on a slightly higher plane and prices remain firm.

Reinforcing Bars

The State of Illinois has made some awards based on the new expansion joint design which eliminates the use of dowel pin bars. The lettings by Illinois on Aug 28 called for 1100 tons of bars, none of which have as yet reached fabricators. The only award of note this week is 300 tons for an elevator at Battle Creek, Mich. Outstanding among fresh inquiries, principally because it is a private project, is 220 tons for plant alterations by Acme Steel Co., Riverdale, Ill. On the whole, sales are light while inquiries are moderately better. However, public projects being planned point to a more active market.

Cold-Rolled Strip

Automobile manufacturers are still cutting down their requirements and miscellaneous users find only moderate needs for new shipments. The net result is that production is gradually sinking to lower levels.

Hot-Rolled Strip

Demand is very light. Orders have been placed for automobile frames, but these are not being manufactured until all possible changes for new models have been incorporated in the designs.

Rails

One Chicago district rail mill is operating on a very limited scale and may not hold this rate to the end of the week. The prospects for new rail buying are distinctly bad. The thought is expressed by some that unless conditions improve markedly for the railroads at an early date purchases of rails between now and the end of the year will reach a new extreme low. Track work is slowing down rapidly and accessory orders are near the vanishing point.

Bars

Tractor plants continue to operate with very satisfactory schedules. While many tractors are being taken for miscellaneous uses there is a growing demand for use on farms, especially in the West, where drought sharply cut the available supply of feed for horses and farmers are being forced to turn to mechanical power. Bar consumption by automobile manufacturers is still dropping and, as producers view the situation, will probably continue to do so for a month or more. Farm implement manufacturers are a step nearer larger consumption but have not as yet entered the market.

Plates

Demand for this commodity is still scattered and small, though there are several projects that will take round tonnages. About 725 tons will be needed for the spillway at the Fort Peck, Mont., dam, and some plates will be required on the two dams across the Mississippi River on which bids will soon be taken. The round tonnage for a syphon for the Pineview, Utah, project is still pending. There appears to be no immediate prospect of tonnage developing in oil producing areas, but municipalities using Government money for water supply projects are expected to order some tanks.

Structural Material

Awards total only about 2000 tons and fresh inquiries barely exceed the 4000-ton mark. Outstanding as an inquiry is 4000 tons for the Farnum Street bridge at Omaha, Neb. Shop operations in this district are steady but at a low rate. The general average is helped by work that is being done here on members for the San Francisco Bay bridge. The labor situation at Milwaukee is unchanged with three out of four shops closed on account of strikes.

Scrap

Heavy melting steel has sagged another 25c. a ton to $8.75 at the top. Sales have been small but serve to reflect the true condition of the market. Work has already started on dismantling the Indiana electric line that recently was sold for scrap, and in a few weeks the work of taking up rails on the Kansas City line will be under way. There is little demand for relaying rails and prices have sagged to a range of $16 to $20 a ton for weights of 60 lb. and over. Little of the scrap being offered by the Pere Marquette, Chesapeake & Ohio, Great Northern and Nickel Plate will move into this market. Steel mills continue to accept shipments, which are being added to stock piles.

New York Steel Market Shows Slight Improvement

Some Scattered Replenishment Buying—Export Tin Plate in Another Advance—Pig Iron Sales Total 4100 Tons

NEW YORK, Sept. 11.—The finished steel market in this district is still very quiet, although commencing to show signs of seasonal improvement. Apparently some consumers are beginning to exhaust stocks in certain sizes that they accumulated in the second quarter. However, tin plate, which has been the brightest spot in the market for months, is becoming less active as the packing season approaches a close. The recession in tin plate demand applies to both domestic and foreign business. Export buying has been marked by heavy anticipatory buying in recent months as the result of the establishment of the international pool. A number of advances occurred as the progress of negotiations made the world-wide pact more certain. Now that the international understanding is in full effect, all export prices are quoted on the basis of c.i.f. foreign port, with the result that prices f.o.b. mill vary somewhat after the deduction of transportation costs. The present price of American tin plate for export approximates $4.33 per 100 lb., f.o.b. mill, Pittsburgh. This compares with a price of $3.60, which was current as recently as last April.

Kenny Brothers, Inc., submitted the low general contractors' bid on pier shed No. 32, Hudson River, New York, requiring 4500 tons of structural steel. General contract bids on the downtown post office building, New York, to be known as the United States Federal Office Building, will be taken Oct. 2. The structural steel requirements are estimated at 12,000 to 15,000 tons, while the reinforcing bars may run up to as high as 2000 tons. The Erie Railroad is in the market for a ferry boat which will require 500 to 600 tons of steel. The vessel will cost about $680,000 and will be paid for with Federal funds left over from a previous PWA allotment. The Pennsylvania Railroad has sent out alternative inquiries for 10, 25, 30 or 50 electric locomotives. Approximately 2500 tons of plates are in the market for a riveted pipe project for a suburb of Washington.

Pig Iron

Sales of three or four comparatively large tonnages of iron during the last week have given the market a somewhat more cheerful outlook. Aggregate bookings of 4100 tons compare with only 800 in the preceding week and with 400 tons in the previous seven-day period. In view of the fact that a few orders constituted the bulk of the past week's business, sellers are reluctant to predict that fourth quarter buying is actually getting under way. The majority of current bookings are the usual 50 and 100-ton lots and most of the consumers in this district still have plentiful stocks to take care of present low production schedules.

Reinforcing Steel

Road mesh still constitutes the principal activity in this market. About 800 tons has been placed in the last week, all for work in New York State. The American Steel & Wire Co. has also secured a release on 450 tons of mesh for foundation work on three units of Rockefeller Center. The bar requirements are being shipped to this job regularly. Bids will be taken Oct. 2 on the United States Federal Office Building in Manhattan and reinforcing bar requirements are likely to run as high as 2000 tons.

Scrap

With domestic consumers supplied by this district still apathetic to their future requirements, the local scrap market remains very quiet. One or two eastern Pennsylvania mills have reduced their buying prices in an effort to reduce shipments, but are still receiving more scrap than they want. The export market is holding its own and brokers are considering additional inquiry from several sources. Quotations on the principal grades of scrap are unchanged.

Cast Pipe Shipments Better in South

BIRMINGHAM, Sept. 11.—The pig iron market continues in a deep rut, with no prospects of early change. Buying is exceedingly light, as are shipments, since contract tonnage on the books of producers is not large. Present business is mostly in small lots, a car or two at a time, for prompt shipment. Little interest has been shown in fourth quarter iron since books were opened on Sept. 1. A few small orders have been booked, but nothing more. The current price of $14.50 also prevails for the next period.

Strikes have affected both the operations and markets of some of the foundries. The stove foundries at Rome, Ga., an important stove producing center, are beset with a strike that has practically stopped all manufacture. A number of other foundries have also had strikes or face strike threats.

Furnace operations are unchanged, with five stacks active.

Since the first of August cast iron pipe shipments have improved. August shipments were the best in about 18 months. September is also expected to be a more favorable month, although it may not quite equal August. This betterment is due to releases of old PWA awards and the acceleration of releases on recent PWA contracts. Heretofore awards have been made on an indefinite basis and some have been carried six months and more before delivery. In many cases now releases are coming within 30 and 40 days after awards.

The scrap market is dull. Current quotations in some cases are only nominal, as there have been no sales of some classifications in months. There has been a moderate movement of foundry grades, but others have been at a standstill, noticeably heavy melting steel.

Sheets are showing more life, and there has been a moderate amount of buying within the last ten days. Wire products are still lagging, but a pick-up is expected before the end of the month when farmer buying is due to revive. These two lines are about the only ones with a favorable outlook for the next month or so. Prospects for heavy products appear slim for the rest of the year.

Finishing mills are operating on irregular schedules. Six open-hearths are operating, there having been no change in the past several weeks.

R. D. BLAKESLEE has been appointed manager of the Cleveland district sales office of the Sharon Steel Hoop Co., succeeding E. R. GARLICK, who has resigned. Mr. Blakeslee has been connected with the Sharon sales office in Cleveland for 13 years. He has been succeeded as assistant district manager by J. K. OWEN, who has been connected with the Cleveland office for several years.

Output Down Two Points in Eastern Pennsylvania

Ingot Rate Is Now 16 Per Cent—Bridge Award of 4900 Tons Imminent—Low Silicon Foundry Iron Reduced

PHILADELPHIA, Sept. 11.—With current orders and forward commitments continuing at an extremely low point, the iron and steel market in eastern Pennsylvania is listless. Nor do makers see an early prospect for improvement. While some believe demand will expand toward the end of the present month, they base their view on the expectancy of a natural momentum arising from depleted stocks in the hands of consumers rather than upon more tangible evidence.

Railroads are entirely out of the market, demand from automotive sources is almost negligible, and while there is some business in the form of orders for identified structures, it is light.

With these normally large buyers quiescent, there remains the smaller and miscellaneous consuming groups. And while some of the latter are reflecting a somewhat greater desire to buy, actual placements involve only small tonnages. The buying that is taking place is confined almost exclusively to immediate needs. There is no doubt that the generally depressed state of the market is due to lack of confidence and political uncertainty.

Incoming demand of the present week has shown a further decline, with the result that open-hearth output has dropped two points and now is estimated at 16 per cent of capacity. Mill schedules have become increasingly irregular. Some makers, however, report a mild improvement in miscellaneous demand and in these instances operations have been well sustained.

The largest job that has appeared in the structural market for some time is expected to go to the Phoenix Bridge Co., low bidder. It is a bridge for the War Department over Cape Cod Canal and involves 4900 tons of steel.

Pig Iron

With one or two exceptions, blast furnace interests report a further recession in orders and inquiries. Most of those developing call for carlots of foundry grades. One producer reports that demand so far this month is greater than it was in August, but generally a reverse situation prevails. Effective after Sept. 30, the price of foundry iron under 1.75 per cent silicon will be reduced 50c. below the base price. The present differential is 25c. Imports of pig iron into Philadelphia in August totaled 9354 tons, the largest since March, when they amounted to 10,282 tons. The August imports consisted of 6675 tons of Dutch and 2679 tons of Indian iron.

Plates, Shapes and Bars

The market for heavy rolled products continues to sag. A small amount of business for identified structures is coming to the mills, but fabricators are figuring on few and small jobs only as a general thing. The Phoenix Bridge Co. is expected to be awarded the contract for a single-track railroad bridge at Buzzard's Bay, Mass., over Cape Cod Canal, calling for 4900 tons of structural material. The bridge is for the War Department. Representing the largest job which local fabricators have bid on for some time, the bridge will have a single span of 544 ft., the longest lift span ever designed, and will have two 127-ft. tower spans. Five additions to the naval factory in Philadelphia will call for a sizable tonnage of structural steel. The inquiry is expected to come out in early fall.

Miscellaneous and small demand only prevails for plates, coming chiefly from tank and boiler makers. Hot-rolled merchant steel bars are extremely quiet. A somewhat better demand has arisen for cold-drawn bars.

Sheets

The larger buyers are out of the market. Moderate demand is coming from radio and stove makers. Some mills, however, look for bookings soon on forward commitments for automotive use, though large tonnages are said to be improbable.

Warehouse Business

Some jobbers report that demand has shown a slight upturn and is better so far this month than the average for August. Prices remain unchanged.

Imports

The only importation in the iron and steel classification received at Philadelphia last week was 863 tons of pig iron from India.

Scrap

The market is narrow and shows further weakness in tone, though absence of transactions leaves prices unchanged. Axle steel turnings, however, have been marked down 50c.

Miscellaneous Demand Up at Cincinnati

CINCINNATI, Sept. 11.—Miscellaneous demand for steel has improved as the result of widely scattered orders for sheets. The absence of appreciable automotive business, however, is keeping district mill operations at about 25 per cent of capacity. Advance information on programs of household appliance manufacturers indicate that substantial sheet bookings from that source are in the offing.

Current pig iron bookings are for small amounts, but indicate low inventories of consumers. The trade, however, looks for better business late in September, believing that fourth quarter contracting will set in then.

Domestic coke prices are up 25c. a ton to $6, delivered, Cincinnati. Movement of this grade to ultimate consumers is reacting upward in response to the normal seasonal stimulus. Foundry grades continue sluggish.

Warehouse business has shown an upward tendency following the holiday.

Scrap is depressed. Mills refuse new contracts, but take small amounts of material on old contracts. Some dealers, in anticipation of fall needs, are increasing their yard supplies. Prices are nominal, the most important items showing reductions in keeping with the weak market undertone.

Lehigh Valley To Get $3,000,000 PWA Loan

WASHINGTON, Sept. 11.—Allocation of a PWA loan of $3,000,000 to the Lehigh Valley Railroad to be used to build 1900 freight cars in its shops at Sayre, Pa., and to purchase three Diesel-electric switching locomotives was announced today by Public Works Administrator Ickes.

Mr. Ickes also announced that he has signed a contract for a loan of $32,500 to the Missouri Southern Railroad to be used for the purchase of a new Diesel-electric locomotive.

Two previously awarded railroad loan allotments have been rescinded, it was announced. One was a loan of $3,000,000 to the Escanaba, Iron Mountain & Western Railroad for the construction of a concrete ore dock at Escanaba. Instead of building a new dock the company has decided to repair two existing docks. The other rescinded allotment was for a loan of $75,000 to the Fort Smith & Western Railroad, Oklahoma Short Line, for repairs to roadway and equipment.

Ingot Rate in Cleveland Area Drops Nine Points

New Business in Finished Steel Fails to Show Expected Recovery—Large Rivet Prices Reestablished

CLEVELAND, Sept. 11.—The volume of business in finished steel so far this month has lagged slightly behind the corresponding period in August and the sharply restricted demand from the automotive industry for bars and sheets is reflected in a reduction in ingot output in the Cleveland-Lorain territory to near the August average. The Corrigan-McKinney Steel Co., which has been operating three open-hearth furnaces, shut down its steel plant this week. Operations of its finishing mills were discontinued Monday and will not resume during the remainder of the week unless new orders warrant starting up. With the shutting down of this plant and one open-hearth furnace at the Otis plant the gain in ingot output last week attributable to the resumption at Lorain has been nearly offset. Operations in this territory this week are 15 per cent of capacity, a drop of nine points.

Sheet steel is the only product that showed an increase in demand during the week. Some of the refrigerator manufacturers placed small orders for steel for new models, and miscellaneous orders showed a slight gain. Automobile companies have commenced to place orders for parts for 1935 cars, and this should lead shortly to some revival in the demand for steel from this industry, which at present is at very low ebb.

Generally steel orders are for very small lots for fill-in purposes. Although some seasonal revival in activity is looked for during the next few weeks, the steel industry does not find much encouragement in the outlook for the remainder of the year. There is nothing promising in the structural field, business from railroads that center here is expected to be limited to small orders for repair work, and the tonnage that will come from the automotive industry is uncertain. Few plants in the metal-working industry have experienced a revival from the summer lull.

The only new price announcement is the reestablishment of present prices on large rivets for the fourth quarter. Since the reestablishment of steel prices very few contracts have been placed for the quarter.

Pig Iron

Spot demand continues to improve slightly, indicating that more consumers are getting near the end of their stock piles. Shipments so far this month have been about 10 per cent ahead of the corresponding period in August. Orders range from car loads to 200 tons. The heating equipment industry appears to be doing better at present than pig iron consumers in most other fields. New demand from the motor car industry is virtually at a standstill.

Sheets

Miscellaneous orders improved slightly the past week. Some fill-in business came from the automotive industry, but no round-lot inquiries have come from this source for steel for 1935 models. The local Fisher Body plant is still receiving shipments against orders placed several weeks ago. However, automobile companies are placing some parts for new models and pressure for low prices on parts is in evidence. Some new small-lot orders have come from refrigerator manufacturers for steel for new models. These manufacturers have done a good volume of business this year and seem hopeful of increased sales next year.

Strip

New demand is very light for both hot and cold strip, being confined to small miscellaneous orders. The automotive industry still has ample stocks and is not placing fresh orders.

Bolts, Nuts and Rivets

Present prices on large rivets have been reaffirmed for the fourth quarter. They are $2.90 per 100 lb., Cleveland and Pittsburgh; $3, Chicago, and $3.05, Birmingham. Small rivets, as announced last week, have been reaffirmed at 70 and 5 per cent discount. Demand for these products continues light. Rivet manufacturers expect orders for rivets for the new Navy vessels will be placed in a few weeks.

Bars, Plates and Shapes

Two structural awards aggregating over 1300 tons, the Toledo Y.M.C.A. and a State highway bridge, were made during the week. Bids were taken in Detroit today for the Chevrolet Motor Co. assembly plant in Baltimore, the latest estimate on the steel requirement being 5500 tons. There is a scarcity of new inquiry in the structural field. Ohio highway bridge work, which has furnished a fair tonnage during the past few months, is tapering off. Demand for steel bars is limited to very small miscellaneous lots. Plates remain dull.

Scrap

A local mill continues to take small quantities of blast furnace scrap, and activity of dealers is confined mostly to buying against these orders. The market is weak, but in the absence of sales quotations are unchanged and nominal. The New York Central Railroad last week sold about 800 tons of cast iron carwheels at $9.75, which was $1 a ton below recent quotations.

Mill Operations Still Lagging on Coast

SAN FRANCISCO, Sept. 10.—Despite the large size of various pending major projects, mill production has failed to regain the momentum lost at the close of the second quarter. There has been but limited demand for structural and reinforcing items, although sales on light plates and sheets have shown slight increases. Wire products have been steadier. Tubular demand has been slightly stimulated by municipal work. Ingot production continues restricted. Scrap exports to the Orient have shown favorable increases, with prices continuing at $10 to $12 per gross ton.

With bids being taken in October on a section of the Colorado River aqueduct, the attention of the steel industry is centered on southern California. From 58,000 to 68,000 tons of steel is involved in this unit and a second unit for which specifications are to be issued shortly by the Metropolitan Water District.

New projects listed during the week were confined largely to school reconstruction in the Los Angeles district and to Federal works. Awards of 205 tons of sheet piling for piers on the Trans-Bay bridge at San Francisco to Pacific Coast Steel Corpn. and 850 tons of cast iron pipe at Chehalis, Wash., to United States Pipe & Foundry Co. were the only sizeable bookings. No steel awards by the general contractor on the Grand Coulee dam have yet been reported.

Prices of Finished Steel and Iron Products

BARS, PLATES, SHAPES

Iron and Steel Bars

	Soft Steel	*Base per Lb.*
F.o.b. Pittsburgh		1.80c.
F.o.b. Chicago		1.85c.
F.o.b. Gary		1.85c.
F.o.b. Duluth		1.95c.
Del'd Detroit		1.95c.
F.o.b. Cleveland		1.85c.
F.o.b. Buffalo		1.90c.
Del'd Philadelphia		2.09c.
Del'd New York		2.13c.
F.o.b. Birmingham		1.95c.
F.o.b. cars dock Gulf ports		2.20c.
F.o.b. cars dock Pacific ports		2.35c.

Rail Steel
(For merchant trade)

F.o.b. Pittsburgh	1.70c.
F.o.b. Chicago	1.75c.
F.o.b. Gary	1.75c.
F.o.b. Moline, Ill.	1.75c.
F.o.b. Cleveland	1.75c.
F.o.b. Buffalo	1.80c.
F.o.b. Birmingham	1.85c.
F.o.b. cars dock Gulf ports	2.10c.
F.o.b. cars dock Pacific ports	2.25c.

Billet Steel Reinforcing
(Straight lengths as quoted by distributers)

F.o.b. Pittsburgh	2.05c.
F.o.b. Chicago	2.10c.
F.o.b. Gary	2.10c.
Del'd Detroit	2.20c.
F.o.b. Cleveland	2.10c.
F.o.b. Youngstown	2.10c.
F.o.b. Buffalo	2.10c.
F.o.b. Birmingham	2.10c.
F.o.b. cars dock Gulf ports	2.45c.
F.o.b. cars dock Pacific ports	2.45c.

Rail Steel Reinforcing
(Straight lengths as quoted by distributers)

F.o.b. Pittsburgh	1.90c.
F.o.b. Chicago	1.95c.
F.o.b. Gary	1.95c.
F.o.b. Cleveland	1.95c.
F.o.b. Youngstown	1.95c.
F.o.b. Buffalo	1.95c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.30c.
F.o.b. cars dock Pacific ports	2.30c.

Iron

F.o.b. Chicago	1.80c.
F.o.b. Terre Haute, Ind.	1.75c.
F.o.b. Louisville, Ky.	2.10c.
F.o.b. Danville, Pa.	1.80c.
F.o.b. Berwick, Pa.	1.80c.

Cold Finished Bars and Shafting*

	Base per Lb.
F.o.b. Pittsburgh	2.10c.
F.o.b. Chicago	2.15c.
F.o.b. Gary	2.15c.
F.o.b. Cleveland	2.15c.
F.o.b. Buffalo	2.20c.
Del'd Detroit	2.30c.
Del'd eastern Michigan	2.35c.

* In quantities of 10,000 to 19,000 lb.

Fence and Sign Posts

Angle Line Posts

	Base per Net Ton
F.o.b. Pittsburgh	$50.00
F.o.b. Chicago	50.00
F.o.b. Duluth	51.00
F.o.b. Cleveland	50.00
F.o.b. Birmingham	53.00
F.o.b. Houston	59.00
F.o.b. cars dock Pacific ports	68.00

Plates

	Base per Lb.
F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
F.o.b. Gary	1.85c.
Del'd Cleveland	1.985c.
F.o.b. Coatesville	1.90c.
F.o.b. Sparrows Point	1.90c.
Del'd Philadelphia	1.985c.
Del'd New York	2.08c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.35c.
Wrought iron plates, f.o.b. P'gh	3.00c.

Floor Plates

F.o.b. Pittsburgh	3.35c.
F.o.b. Chicago	3.40c.
F.o.b. Coatesville	3.45c.
F.o.b. cars dock Gulf ports	3.75c.
F.o.b. cars dock Pacific ports	3.90c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
Del'd Cleveland	1.985c.
F.o.b. Buffalo	1.90c.
F.o.b. Bethlehem	1.90c.
Del'd Philadelphia	2.005c.
Del'd New York	2.0525c.
F.o.b. Birmingham (standard)	1.95c.
F.o.b. cars dock Gulf ports	2.25c.
F.o.b. cars dock Pacific ports	2.35c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	2.15c.
F.o.b. Chicago	2.25c.
F.o.b. Buffalo	2.25c.
F.o.b. cars dock Gulf ports	2.60c.
F.o.b. cars dock Pacific ports	2.60c.

SHEETS, STRIP, TIN PLATE TERNE PLATE

Sheets

Hot Rolled

	Base per Lb.
No. 10, f.o.b. Pittsburgh	1.85c.
No. 10, f.o.b. Gary	1.95c.
No. 10, del'd Detroit	2.05c.
No. 10, del'd Phila.	2.14c.
No. 10, f.o.b. Birmingham	2.00c.
No. 10, f.o.b. dock cars Pacific ports	2.40c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.40c.
No. 24, f.o.b. Gary	2.50c.
No. 24, del'd Detroit	2.60c.
No. 24, del'd Phila.	2.69c.
No. 24, f.o.b. Birmingham	2.55c.
No. 24, f.o.b. dock cars Pacific ports	3.05c.
No. 24, wrought iron, Pittsburgh	4.30c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	2.50c.
No. 10 gage, f.o.b. Gary	2.60c.
No. 10 gage, del'd Detroit	2.70c.
No. 10 gage, del'd Phila.	2.79c.
No. 10 gage, f.o.b. Birmingham	2.55c.
No. 10 gage, f.o.b. dock cars Pacific ports	3.10c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	2.95c.
No. 20 gage, f.o.b. Gary	3.05c.
No. 20 gage, del'd Detroit	3.15c.
No. 20 gage, del'd Phila.	3.24c.
No. 20 gage, f.o.b. Birmingham	3.10c.
No. 20 gage, f.o.b. dock cars Pacific ports	3.50c.

Galvanized Sheets

No. 24, f.o.b. Pittsburgh	3.10c.
No. 24, f.o.b. Gary	3.20c.
No. 24, del'd Phila.	3.39c.
No. 24, f.o.b. Birmingham	3.25c.
No. 24, f.o.b. dock cars Pacific ports	3.70c.
No. 24, wrought iron, Pittsburgh	4.95c.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh	3.40c.
F.o.b. cars dock Pacific ports	4.10c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	3.10c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.75c.
No. 28, Gary	2.85c.
No. 28, cars dock, Pacific Coast ports	3.35c.

Tin Plate *Base per Box*

Standard cokes, f.o.b. P'gh district mill	$5.25
Standard cokes, f.o.b. Gary	5.35
Standard cokes, f.o.b. cars dock Pacific ports	5.90

Terne Plate
(F.o.b. Pittsburgh)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$10.00
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.00
30-lb. coating I.C.	15.25
40-lb. coating I.C.	17.50

Hot-Rolled Hoops, Bands, Strips and Flats under ¼ In.

	Base per Lb.
All widths up to 24 in., P'gh	1.85c.
All widths up to 24 in., Chicago	1.95c.
All widths up to 24 in., del'd Detroit	2.05c.
All widths up to 24 in., Birmingham	2.00c.
Cooperage stock, Pittsburgh	2.10c.
Cooperage stock, Chicago	2.20c.

Cold-Rolled Strips

	Base per Lb.
F.o.b. Pittsburgh	2.60c.
F.o.b. Cleveland	2.60c.
Del'd Chicago	2.88c.
F.o.b. Worcester	2.80c.

Fender Stock

No. 16 and heavier, Pittsburgh or Cleveland	3.15c.
F.o.b. Worcester	3.55c.
No. 17 and lighter, Pittsburgh or Cleveland	3.30c.
F.o.b. Worcester	3.70c.

Hot-Rolled Rail Steel Strips

	Base per Lb.
F.o.b. Pittsburgh	1.70c.
F.o.b. Chicago	1.75c.
F.o.b. Birmingham	1.85c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

	To Manufacturing Trade Per Lb.
Bright wire	2.30c.
Spring wire	3.20c.

Chicago prices on products sold to the manufacturing trade are $1 a ton above Pittsburgh or Cleveland.

To Jobbing Trade

Qualified jobbers are entitled to a reduction of 20c. a 100 lb. from the base price on carload shipments to stock, and of 10c. a 100 lb. on less-carload shipments to stock.

	Base per Keg
Standard wire nails	$2.60
Smooth coated nails	2.60
Galvanized nails:	
15 gage and coarser	4.60
16 gage and finer	5.10

	Base per 100 Lb.
Annealed fence wire	$2.45
Galvanized fence wire	2.80
Polished staples	3.30
Galvanized staples	3.55
Barbed wire, galvanized	3.00
Woven wire fence, base column	63.00

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is $2 above Pittsburgh); Duluth, Minn., and Worcester, Mass., mill prices are $2 a ton over Pittsburgh (except for woven wire fence at Duluth which is $3 over Pittsburgh), and Birmingham mill prices are $3 a ton over Pittsburgh.

On manufacturers' wire prices at Pacific ports are $9 above the Pittsburgh base. On high-carbon spring wire, prices at Pacific ports are also $9 above Pittsburgh. On wire nails, barbed wire, staples and fence wire, prices at Houston, Galveston and Corpus Christi are $6 a ton over Pittsburgh, while New Orleans and Pacific Coast prices are $8 over Pittsburgh. Exception: on fence wire Pacific Coast prices are $11 a ton above Pittsburgh.

Wire Hoops, Twisted or Welded

	Off List
F.o.b. Pittsburgh	35 and 2½ off
F.o.b. Chicago	35 off

Bale Ties, Single Loop

	Base per Net Ton
F.o.b. Pittsburgh	$63.00
F.o.b. Chicago	64.00
F.o.b. Duluth	65.00
F.o.b. Cleveland	63.00
F.o.b. Birmingham	66.00
F.o.b. cars dock Houston, Galveston, Beaumont, Orange or Corpus Christi, Tex.	72.00
F.o.b. cars dock Pacific ports	74.00

STEEL AND WROUGHT PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel Inches	Black	Galv.
⅛	..51½	29½
¼ to ⅜	..53½	35
½	..58½	47
¾	..62	52
1 to 3	..64	55

Wrought Iron Inches	Black	Galv.
⅛	..+91½	+138
¼ & ⅜	..+1½	+21½
½	..31½	15
¾	..36½	20½
1 & 1¼	..39½	25½
1½	..43½	28
2	..41½	26

Lap Weld

2	..60	51	2	..37	22½
2½ to 3	..63	54	2½ to 3½	38	25
3½ to 6	..65	56	4 to 8	..40	28½
7 and 8	..64	54	9 to 12	..38	24½
9 and 10	..63½	53½			
11 and 12	..62½	52½			

Butt Weld, extra strong, plain ends

⅛	..48½	33½	⅛	..+13	+45½
¼ to ⅜	..51	38	¼ & ⅜	+2½	+34½
½	..56½	47½	½	..32½	17½
¾	..61	52	¾	..37½	22½
1 to 3	..63	55	1 to 2	..43½	29

Lap Weld, extra strong, plain ends

2	..58	50	2	..40	26
2½ to 3	..62	54	2½ to 4	45½	32
3½ to 6	..65½	57½	4½ to 6	45	33½
7 and 8	..64½	54½	7 & 8	..46	33
9 and 10	..63½	53½	9 to 12	..41½	30
11 and 12	..62½	52½			

On standard steel pipe an extra 5% off is allowed on sales to consumers while two 5's off apply on sales to jobbers. On less-than-carload shipments prices are determined by adding 20 and 25% and the carload freight rate to the base card. On structural steel pipe the base card is reduced 2 points and two 5's off are allowed to consumers and three 5's off to jobbers.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes
(Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots)

		Cold Drawn	Hot Rolled
1 in. o.d.	13 B.W.G.	$ 8.60	$7.82
1¼ in. o.d.	13 B.W.G.	10.19	9.26
1½ in. o.d.	13 B.W.G.	11.26	10.23
1¾ in. o.d.	13 B.W.G.	12.81	11.64
2 in. o.d.	13 B.W.G.	14.35	13.04
2¼ in. o.d.	13 B.W.G.	16.00	14.54
2½ in. o.d.	12 B.W.G.	19.29	17.54
2¾ in. o.d.	12 B.W.G.	20.45	18.59
3 in. o.d.	12 B.W.G.	21.45	19.50
3¼ in. o.d.	11 B.W.G.	25.22	22.93
3½ in. o.d.	11 B.W.G.	27.09	24.62
4 in. o.d.	10 B.W.G.	33.60	30.54
4½ in. o.d.	10 B.W.G.	41.08	37.35
5 in. o.d.	9 B.W.G.	51.56	46.87
6 in. o.d.	7 B.W.G.	79.15	71.96

Extras for less-carload quantities:
25,000 lb. or ft. to 39,999 lb. or ft. 5 %
10,000 lb. or ft. to 24,999 lb. or ft. 12½ %
2,000 lb. or ft. to 9,999 lb. or ft. 25 %
Under 2,000 lb. or ft. 40 %

Hot-Finished Lapweld Steel Pressure Tubes
(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

1½ in. o.d.	13 B.W.G.	$ 9.72
1¾ in. o.d.	13 B.W.G.	11.06
2 in. o.d.	13 B.W.G.	12.38
2¼ in. o.d.	13 B.W.G.	13.79
2½ in. o.d.	12 B.W.G.	16.58
2¾ in. o.d.	12 B.W.G.	17.54
3 in. o.d.	12 B.W.G.	18.35
3¼ in. o.d.	11 B.W.G.	21.56
3½ in. o.d.	11 B.W.G.	23.15
4 in. o.d.	10 B.W.G.	28.66
4½ in. o.d.	10 B.W.G.	35.22
5 in. o.d.	9 B.W.G.	44.25
6 in. o.d.	7 B.W.G.	68.14

Quantity Extras:
40,000 lb. or ft. base
25,000 lb. or ft. to 39,999 lb. or ft. plus 5 %
10,000 lb. or ft. to 24,999 lb. or ft. plus 12½ %
2,000 lb. or ft. to 9,999 lb. or ft. plus 25 %
Under 2,000 lb. or ft. plus 40 %

CHARCOAL IRON BOILER TUBES

Base Discounts, f.o.b. Pittsburgh

In. O. D.	
1½ and 1¾	44
2 —2¼	13 and 10
2½—2¾	16 and 10
3	17 and 10
3¼—3½	18 and 10
4	20 and 10
4½, 5, 6	21 and 10

Extras for quantity: For 1½ to 1¾, up 8 points under 10,000 lb., up 4 points 10,000 lb. to carload. For 2 in. to 5½ in., up 2 points without supplementary 10 per cent, under 10,000 lb.; supplementary 5 per cent instead of supplementary 10 per cent for 10,000 lb. to carload.

In sizes 2 in. to 4½ in. O.D. inclusive, all tubes more than four gages heavier than standard are priced per lb. as follows: Carload and over, 9c.; extras for quantity—under 10,000 lb. 1c. per lb., 10,000 lb. to carload ½c. per lb.

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$47.00
4-in., del'd Chicago	50.00
6-in. and larger, del'd New York	45.00
4-in. del'd New York	48.00
6-in., and larger, Birmingham	39.00
4-in. Birmingham	42.00

Class "A" and gas pipe, $3 extra

RAILROAD MATERIALS

Rails and Track Supplies

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton	$36.37½
Angle bars, per 100 lb.	2.55

F.o.b. Code Basing Points

Light rails (from billets) per gross ton	$35.00
Light rails (from rail steel) per gross ton	34.00

	Base per 100 Lb.
Spikes, 9/16 in. and larger	$2.40
Spikes, ½ in. and smaller	2.40
Spikes, boat and barge	2.40
Tie plates, steel	1.90
Track bolts, to steam railroads	3.55
Track bolts, no jobbers, all sizes (per 100 count)	.70 per cent off list

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Buffalo, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa.; on spikes alone, Cleveland, Youngstown, Lebanon, Pa., Columbia, Pa., Richmond, Va., Jersey City, N. J.

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine bolts	70
Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, Pittsburgh	75
Stove bolts in packages, Chicago	75
Stove bolts in packages, Cleveland	75
Stove bolts in bulk, P'gh	83
Stove bolts in bulk, Chicago	83
Stove bolts in bulk, Cleveland	83
Tire bolts	60

Large Rivets

(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.90
F.o.b. Chicago	3.00
F.o.b. Birmingham	3.05

Small Rivets

(7/16-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 5
F.o.b. Cleveland	70 and 5
F.o.b. Chicago and Birm'g'm	70 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws, 1 in. dia. and smaller	75, 10 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75 and 10
Milled headless set screws, cut thread ¾ in. and smaller	75
Upset hex. head cap screws, U.S.S.S. or S.A.E. thread, 1 in. dia. and smaller	85
Upset set screws, cut and oval point	75 and 10
Milled studs	65

Alloy and Stainless Steel

Alloy Steel Ingots

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.
Uncropped .....$40 per gross ton

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.
Base price, $49 a gross ton.
Price del'd Detroit is $52.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.
Open-hearth grade, base .....2.45c.
Delivered price at Detroit is .....2.60c.

S.A.E. Series Numbers	Alloy Differential per 100 lb.
2000 (1¼% Nickel)	$0.25
2100 (2½% Nickel)	0.55
2300 (3½% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum) (1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	base
6100 Chromium Vanadium Bar	1.20
4100 Chromium Vanadium Spring Steel	0.95
Chromium Nickel Vanadium	1.50
Carbon Vanadium	0.95

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. The differential for cold-drawn bars is ½c. per lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 2.95c. base per lb.

STAINLESS STEEL No. 302

(17 to 19% Cr, 7 to 9% Ni, 0.08 to 0.20% C)

(Base Prices, f.o.b. Pittsburgh)

	Per Lb.
Bars	23c.
Plates	26c.
Sheets	33c.
Hot-rolled strip	20¾c.
Cold-rolled strip	27c.

Raw and Semi-Finished Steel

Carbon Steel Rerolling Ingots

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham.
Uncropped .....$29 per gross ton

Carbon Steel Forging Ingots

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Birmingham.
Uncropped .....$31 per gross ton

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham.

	Per Gross Ton
Rerolling	$27.00
Forging quality	32.00
Delivered Detroit	
Rerolling	$30.00
Forging	35.00

Billets Only F.o.b. Duluth

Rerolling	$29.00
Forging	34.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open-hearth or Bessemer	$28.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved	1.70c.
Universal	1.70c.
Sheared	1.70c.

Tube Rounds

	Base per Lb.
F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
F.o.b. Cleveland	1.85c.
F.o.b. Buffalo	1.90c.
F.o.b. Birmingham	1.95c.

Wire Rods

(Common soft, base)

	Per Gross Ton
F.o.b. Pittsburgh	$38.00
F.o.b. Cleveland	38.00
F.o.b. Chicago	39.00
F.o.b. Anderson, Ind.	39.00
F.o.b. Youngstown	39.00
F.o.b. Worcester, Mass.	40.00
F.o.b. Birmingham	41.00
F.o.b. San Francisco	47.00

Pig Iron and Ferroalloys

PIG IRON

PRICES PER GROSS TON AT BASING POINTS

Basing Points	No. 2 Fdry.	Malleable	Basic	Bessemer
Everett, Mass.	$19.50	$20.00	$19.00	$20.50
Bethlehem, Pa.	19.50	20.00	19.00	20.50
Birdsboro, Pa.	19.50	20.00	19.00	20.50
Swedeland, Pa.	19.50	20.00	19.00	20.50
Steelton, Pa.	....	....	19.00	....
Sparrows Point, Md.	19.50	....	19.00	....
Neville Island, Pa.	18.50	18.50	18.00	19.00
Sharpsville, Pa.	18.50	18.50	18.00	19.00
Youngstown	18.50	18.50	18.00	19.00
Buffalo	18.50	19.00	17.50	19.50
Erie, Pa.	18.50	19.00	18.00	19.50
Cleveland	18.50	18.50	18.00	19.00
Toledo, Ohio	18.50	18.50	18.00	19.00
Jackson, Ohio	20.25	20.25	19.75	....
Detroit	18.50	18.50	18.00	19.00
Hamilton, Ohio	18.50	18.50	18.00	19.00
Chicago	18.50	18.50	18.00	19.00
Granite City, Ill.	18.50	18.50	18.00	....
Duluth, Minn.	19.00	19.00	....	19.50
Birmingham	14.50	14.50	13.50	19.00
Provo, Utah	17.50	....	....	....

DELIVERED PRICES PER GROSS TON AT CONSUMING CENTERS

	No. 2 Fdry.	Malleable	Basic	Bessemer
Boston Switching District				
From Everett, Mass.	$20.00	$20.50	$19.50	$21.00
Brooklyn				
From East Pa. or Buffalo	21.77	22.27	21.27	22.77
Newark or Jersey City, N. J.				
From East. Pa. or Buffalo	20.89	21.39	20.39	21.89
Philadelphia				
From Eastern Pa.	20.26	20.76	19.76	21.26
Cincinnati				
From Hamilton, Ohio	19.51	19.51	19.01	20.01
Canton, Ohio				
From Cleveland and Youngstown	19.76	19.76	19.26	20.26
Columbus, Ohio				
From Hamilton, Ohio	20.50	20.50	....	....
Mansfield, Ohio				
From Cleveland and Toledo	20.26	20.26	....	....
Indianapolis				
From Hamilton, Ohio	20.77	20.77	....	....
South Bend, Ind.				
From Chicago	20.55	20.55	....	....
Milwaukee				
From Chicago	19.50	19.50	....	....
St. Paul				
From Duluth	20.94	....	....	....
Davenport, Iowa				
From Chicago	20.26	20.26	....	....
Kansas City				
From Granite City	21.04	21.04	....	....

Delivered prices on Southern iron for shipment to Northern points are 38c. a gross ton below delivered prices from the nearest Northern basing points.

LOW PHOSPHORUS PIG IRON

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y. $23.50
Johnson City, Tenn. 19.50
Del'd Chicago 25.15

GRAY FORGE PIG IRON

Valley furnace $18.25

CHARCOAL PIG IRON

Lake Superior furnace $21.00
Delivered Chicago 24.04
Delivered Buffalo 24.28

CANADA

Pig Iron

Per gross ton:

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	$21.00
No. 2 fdy., sil. 1.75 to 2.75	20.50
Malleable	21.00

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$22.50
No. 2 fdy., sil. 1.75 to 2.25	22.00
Malleable	22.50
Basic	22.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

	Per Gross Ton
Domestic, 80% (carload)	$85.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$26.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50% (carloads)	$77.50
50% (ton lots)	85.00
75% (carloads)	126.00
75% (ton lots)	136.00
14% to 16% (f.o.b.) Welland, Ont. (in carloads) (duty paid)	31.00
14% to 16% (less carloads)	38.50

Silvery Iron

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
6%	$22.75	12%	$29.25
7%	23.75	13%	30.75
8%	24.75	14%	32.25
9%	25.75	15%	33.75
10%	26.75	16%	35.25
11%	27.75	17%	36.75

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
10%	$27.75	14%	$33.25
11%	28.75	15%	34.75
12%	30.25	16%	36.25
13%	31.75	17%	37.75

Manganese 1½ to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.75% or over, $1 ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W. del., carloads	$1.35 to $1.40
Ferrotungsten, less carloads	1.45 to 1.55
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr. per lb. contained Cr. delivered, in carloads	20.00c.
Ferrochromium, 2% carbon	16.50c. to 17.00c.
Ferrochromium, 1% carbon	17.50c. to 18.00c.
Ferrochromium, 0.10% carbon	19.50c. to 20.00c.
Ferrochromium, 0.06% carbon	20.00c. to 20.50c.
Ferrovanadium, del., per lb. contained V	$2.70 to $2.90
Ferrocarbontitanium, 15 to 18% Ti, 6 to 8% C, f.o.b. furnace carload and contract per net ton	$137.50
Ferrophosphorus, electric, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton with $2 unitage	50.00
Ferrophosphorus, electric, 24% f.o.b. Anniston, Ala., per gross ton with $2.75 unitage	65.00
Ferromolybdenum, per lb. Mo., del.	95c.
Calcium molybdate, per lb. Mo., del.	80c.
Silico spiegel, per ton, f.o.b. furnace, car lots	$38.00
Ton lots or less, per ton	45.50
Silico-manganese, gross ton, delivered:	
2.50% carbon grade	90.00
2% carbon grade	95.00
1% carbon grade	105.00
Spot prices	$5 a ton higher

Iron and Steel Scrap

PITTSBURGH

Per gross ton delivered consumers' yards:		
No. 1 heavy melting steel	$10.50 to	$11.00
No. 2 heavy melting steel	9.50 to	10.00
No. 2 railroad wrought	10.50 to	11.00
Scrap rails	10.50 to	11.00
Rails 3 ft. and under	13.50 to	14.00
Compressed sheet steel	10.50 to	11.00
Hand bundled sheet steel	9.50 to	10.00
Hvy. steel axle turnings	9.50 to	10.00
Machine shop turnings	7.25 to	7.75
Short shov. turnings	7.25 to	7.75
Short mixed borings and turnings	7.00 to	7.50
Cast iron borings	7.00 to	7.50
Cast iron carwheels	11.50 to	12.00
Heavy breakable cast	10.00 to	10.50
No. 1 cast	11.50 to	12.00
Railr. knuckles and couplers	13.50 to	14.00
Rail, coil and leaf springs	13.50 to	14.00
Rolled steel wheels	13.50 to	14.00
Low phos. billet crops	13.50 to	14.00
Low phos. sheet bar crops	12.50 to	13.00
Low phos. plate scrap	12.50 to	13.00
Low phos. punchings	13.00 to	13.50
Steel car axles	13.50 to	14.00

CHICAGO

Delivered Chicago district consumers:

	Per Gross Ton	
Heavy melting steel	$8.25 to	$8.75
Automobile hvy. melt. steel	7.75 to	8.25
Shoveling steel	8.25 to	8.75
Hydraulic comp. sheets	7.25 to	7.75
Drop forge flashings	6.75 to	7.25
No. 1 busheling	6.75 to	7.25
Rolled carwheels	10.00 to	10.50
Railroad tires	10.00 to	10.50
Railroad leaf springs	10.00 to	10.50
Axle turnings	8.00 to	8.50
Steel couplers and knuckles	9.75 to	10.25
Coil springs	10.50 to	11.00
Axle turnings (elec. fur.)	8.00 to	8.50
Low phos. punchings	10.00 to	10.50
Low phos. plates, 12 in. and under	10.00 to	10.50
Cast iron borings	5.00 to	5.50
Short shoveling turnings	5.00 to	5.50
Machine shop turnings	4.75 to	5.25
Rerolling rails	10.00 to	10.50
Steel rails, less then 3 ft.	10.00 to	10.50
Steel rails, less than 2 ft.	10.50 to	11.00
Angle bars, steel	9.50 to	10.00
Cast iron carwheels	9.50 to	10.00
Railroad malleable	8.50 to	9.00
Agricultural malleable	7.75 to	8.25

	Per Net Ton	
Iron car axles	$12.00 to	$12.50
Steel car axles	10.00 to	10.50
No. 1 railroad wrought	6.75 to	7.25
No. 2 railroad wrought	7.25 to	7.75
No. 2 busheling	3.50 to	4.00
Locomotive tires, smooth	9.00 to	9.50
Pipe and flues	4.50 to	5.00
No. 1 machinery cast	8.00 to	8.50
Clean automobile cast	8.00 to	8.50
No. 1 railroad cast	7.50 to	8.00
No. 1 agricultural cast	7.00 to	7.50
Stove plate	5.25 to	5.75
Grate bars	4.75 to	5.25
Brake shoes	6.00 to	6.50

PHILADELPHIA

Per gross ton delivered consumers' yards:		
No. 1 heavy melting steel	$9.50 to	$10.00
No. 2 heavy melting steel	8.00 to	8.50
No. 1 railroad wrought	$11.00 to	11.50
Bundled sheets	....	9.00
Hydraulic compressed, new	....	9.50
Hydraulic, compressed, old	6.50 to	7.00
Machine shop turnings	5.50 to	6.00
Heavy axle turnings	8.50 to	9.00
Cast borings	5.00 to	5.50
Heavy breakable cast	9.50 to	10.00
Stove plate (steel works)	....	8.00
No. 1 low phos. heavy	14.00 to	14.50
Couplers and knuckles	13.50 to	14.00
Rolled steel wheels	13.50 to	14.00
No. 1 blast furnace	5.00 to	5.50
Spec. iron and steel pipe	....	8.00
Shafting	15.00 to	16.00
Steel axles	....	14.50
No. 1 forge fire	....	9.00
Cast iron car wheels	11.00 to	11.50
No. 1 cast	11.50 to	12.00
Cast borings (chem.)	12.00 to	14.00
Steel rails for rolling	....	12.00

CINCINNATI

Dealers' buying prices per gross ton:		
Heavy melting steel	$6.75 to	$7.25
Scrap rails for melting	8.00 to	8.50
Loose sheet clippings	3.00 to	3.50
Bundled sheets	5.50 to	6.00
Cast iron borings	4.50 to	5.00
Machine shop turnings	4.00 to	4.50
No. 1 busheling	5.50 to	6.00
No. 2 busheling	2.50 to	3.00
Rails for rolling	8.50 to	9.00
No. 1 locomotive tires	8.25 to	8.75
Short rails	11.00 to	11.50
Cast iron carwheels	7.50 to	8.00
No. 1 machinery cast	8.75 to	9.25
No. 1 railroad cast	8.25 to	8.75
Burnt cast	5.75 to	6.25
Stove plate	5.75 to	6.25
Agricultural malleable	7.75 to	8.25
Railroad malleable	7.75 to	8.25

CLEVELAND

Per gross ton delivered consumers' yards:		
No. 1 heavy melting steel	$8.50 to	$9.00
No. 2 heavy melting steel	8.00 to	8.50
Compressed sheet steel	8.00 to	8.50
Light bundled sheet stampings	6.50 to	7.00
Drop forge flashings	7.50 to	8.00
Machine shop turnings	6.25 to	6.75
Short shoveling turnings	7.00 to	7.50
No. 1 busheling	7.50 to	8.00
Steel axle turnings	7.50 to	8.00
Low phos. billet crops	13.25 to	13.75
Cast iron borings	6.50 to	7.00
Mixed borings and short turnings	6.50 to	7.00
No. 2 busheling	6.50 to	7.00
No. 1 cast	11.50 to	11.75
Railroad grate bars	7.00 to	7.50
Stove plate	6.50 to	7.00
Rails under 3 ft.	14.00 to	14.50
Rails for rolling	15.50 to	18.00
Railroad malleable	11.50 to	12.00
Cast iron carwheels	9.75 to	10.00

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:		
No. 1 heavy melting steel	$9.50 to	$10.50
No. 2 heavy melting scrap	8.50 to	9.00
Scrap rails	9.50 to	10.00
New hydraul. comp. sheets	8.50 to	9.00
Old hydraul. comp. sheets	7.50 to	8.00
Drop forge flashings	8.50 to	9.00
No. 1 busheling	8.50 to	9.00
Hvy. steel axle turnings	6.50 to	7.00
Machine shop turnings	4.00 to	4.50
Knuckles and couplers	11.00 to	11.50
Coil and leaf springs	11.00 to	11.50
Rolled steel wheels	11.00 to	11.50
Low phos. billet crops	11.50 to	12.00
Short shov. steel turnings	5.50 to	6.00
Short mixed borings and turnings	5.50 to	6.00
Cast iron borings	5.50 to	6.00
No. 2 busheling	5.00 to	5.50
Steel car axles	10.50 to	11.00
Iron axles	10.50 to	11.00
No. 1 machinery cast	10.00 to	10.50
No. 1 cupola cast	9.00 to	9.50
Stove plate	8.50 to	8.75
Steel rails, 3 ft. and under	12.00 to	12.50
Cast iron carwheels	10.00 to	10.50
Industrial malleable	10.00 to	10.50
Railroad malleable	10.00 to	10.50
Chemical borings	7.00 to	7.50

BOSTON

Dealers' buying prices per gross ton:		
No. 1 heavy melting steel	$5.50 to	$6.00
Scrap T rails	5.50 to	6.00
No. 2 steel	5.00 to	5.25
Breakable cast	6.00 to	6.50
Machine shop turnings	1.80 to	2.05
Bundled skeleton, long	3.80 to	4.00
Forge flashings	4.25 to	4.50
Blast furnace scrap	2.00 to	2.50
Shafting	11.00 to	11.25
Steel car axles	10.50 to	11.00
Cast iron borings, chemical	7.00 to	7.50
Stove plate	....	6.50
Per gross ton delivered consumers' yards:		
Textile cast	$7.50 to	$9.00
No. 1 machinery cast	7.50 to	9.00
Railroad malleable	11.00 to	11.50

NEW YORK

Dealers' buying prices per gross ton:		
No. 1 heavy melting steel	*$7.00	†$8.00
No. 2 heavy melting steel	*5.50 to	†6.50
Heavy breakable cast	6.50 to	7.00
No. 1 machinery cast	7.00 to	7.50
No. 2 cast	6.25 to	6.75
Stove plate	5.00 to	5.50
Steel car axles	10.75 to	11.50
No. 1 railroad wrought	7.50 to	8.00
No. 1 yard wrought, long	6.50 to	7.00
Spec. iron and steel pipe	4.50 to	5.00
Forge fire	5.50 to	6.00
Rails for rerolling	7.50 to	8.50
Short shoveling turnings	2.50 to	3.00
Machine shop turnings	2.50 to	3.00
Cast borings	3.50 to	3.75
No. 1 blast furnace	2.00 to	2.50
Cast borings (chemical)	11.00 to	11.50
Unprepared yard iron and steel	3.00 to	4.00
Per gross ton, delivered local foundries:		
No. machinery cast		$10.75
No. 1 hvy. cast (cupola size)		9.75
No. 2 cast		8.25

*For direct car loading only.
†Loading on barge.

BIRMINGHAM

Per gross ton delivered consumers' yards:		
Heavy melting steel	....	$8.50
Scrap steel rails	....	9.00
Short shoveling turnings	....	5.50
Stove plates	....	6.50
Steel axles	$10.50 to	11.00
Iron axles	10.50 to	11.00
No. 1 railroad wrought	....	5.50
Rails for rolling	....	10.50
No. 1 cast	9.50 to	10.00
Tramcar wheels	9.00 to	9.50
Cast iron borings, chem.	....	8.00

ST. LOUIS

Per gross ton delivered consumers' yards:		
Selected heavy steel	$8.75 to	$9.25
No. 1 heavy melting	8.00 to	8.50
No. 2 heavy melting	6.50 to	7.00
No. 1 locomotive tires	9.50 to	10.00
Misc. stand-sec. rails	8.75 to	9.25
Railroad springs	9.00 to	9.50
Bundled sheets	6.00 to	6.50
No. 2 railroad wrought	8.00 to	8.50
No. 1 busheling	5.00 to	5.50
Cast iron borings and shoveling turnings	3.00 to	3.50
Rails for rolling	9.75 to	10.25
Machine shop turnings	3.00 to	3.50
Heavy turnings	5.50 to	6.00
Steel car axles	10.50 to	11.00
Iron car axles	12.50 to	13.00
No. 1 railroad wrought	6.00 to	6.50
Steel rails less than 3 ft.	10.75 to	11.25
Steel angle bars	9.00 to	9.50
Cast iron carwheels	7.50 to	8.00
No. 1 machinery cast	8.50 to	9.00
Railroad malleable	8.50 to	9.00
No. 1 railroad cast	8.50 to	9.00
Stove plate	6.50 to	7.00
Agricult. malleable	8.50 to	9.00

DETROIT

Dealers' buying prices per gross ton:		
Heavy melting steel	$6.75 to	$7.25
Borings and short turnings	4.75 to	5.25
Long turnings	$3.75 to	$4.25
No. 1 machinery cast	9.00 to	9.50
Automotive cast	9.75 to	10.25
Hydraul. comp. sheets	6.75 to	7.25
Stove plate	6.25 to	6.75
New factory busheling	5.75 to	6.25
Old No. 2 busheling	4.00 to	4.50
Sheet clippings	3.00 to	3.50
Flashings	5.50 to	6.00
Low phos. plate scrap	7.00 to	7.50

CANADA

Dealers' buying prices per gross ton:

	Toronto	Montreal
Heavy melting steel	$5.50	$5.50
Rails scrap	6.00	4.50
Machine shop turnings	2.50	2.50
Boiler plate	4.50	4.50
Heavy axle turnings	2.50	2.50
Cast borings	3.00	3.00
Steel borings	2.00	2.00
Wrought pipe	2.50	2.50
Steel axles	4.50	6.00
Axles wrought iron	4.50	6.50
No. 1 machinery cast	7.75	9.00
Stove plate	4.50	5.00
Standard carwheels	7.25	7.00
Malleable	6.75	7.00

ORES, FLUORSPAR, COKE, FUEL, REFRACTORIES

Lake Superior Ores

Delivered Lower Lake Ports

	Per Gross Ton
Old range, Bessemer, 51.5% iron	$4.80
Old range, non-Bessemer, 51.50% iron	4.65
Mesabi, Bessemer, 51.50% iron	4.65
Mesabi, non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore

C.i.f. Philadelphia or Baltimore

	Per Unit
Iron, low phos., copper free, 55 to 58% iron, dry Spanish or Algerian	9.50c.
Iron, low phos., Swedish, average 68½% iron	9.50c.
Iron, basic or foundry, Swedish, average, 65% iron	9c.
Iron, basic or foundry, Russian, aver. 65% iron	9c
Manganese, Caucasian, washed 52%	24c
Manganese, African, Indian, 44-48%	21c.
Manganese, African, Indian, 49-51%	24c.
Manganese, Brazilian, 46 to 48%	20c.

	Per Net Ton Unit
Tungsten, Chinese, wolframite, duty paid, delivered*	$17.50 to $18.50
Tungsten, domestic scheelite, delivered†	17.00

	Per Gross Ton
Chrome, 45%, Cr_2O_3, crude, c.i.f. Atlantic Seaboard	$17.00
Chrome, 48% Cr_2O_3, c.i.f. Atlantic Seaboard	20.00

*Quotations nominal in absence of sales.
†Nominal; no supplies available.

Fluorspar

	Per Net Ton
Domestic, washed gravel, 85-5 f.o.b. Kentucky and Illinois mines for all-rail shipment	$15.50 to $16.00
Same grade for Ohio River barge shipment for Kentucky and Illinois River landings	17.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	$15.50 to 16.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	19.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	30.00

COKE, COAL AND FUEL OIL

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville Prompt	$3.85
Foundry, f.o.b. Connellsville Prompt	$4.60 to 5.10
Foundry, by-product, Chicago ovens, for delivery outside switching district	8.50
Foundry, by-product, delivered in Chicago switching district	9.25
Foundry, by-product, New England, delivered	11.00
Foundry, by-product, Newark or Jersey City, del'd	8.20 to 8.81
Foundry, by-product, Phila.	9.00
Foundry, by-product, Cleveland, delivered	$9.25
Foundry, Birmingham	6.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, by-product, del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.80 to $2.05
Mine run coking coal f.o.b. W. Pa.	2.05 to 2.25
Gas coal, ¾-in. f.o.b. Pa. mines	2.25 to 2.55
Mine run gas coal, f.o.b. Pa. mines	2.05 to 2.45
Steam slack, f.o.b. W. Pa. mines	1.55 to 1.65
Gas slack, f.o.b. W. Pa. mines	1.90 to 2.10

Fuel Oil

	Per Gal. f.o.b. Bayonne, N. J.
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.

	Per Gal. f.o.b. Baltimore
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.

	Per Gal. del'd Chicago
No. 3 industrial fuel oil	3.88c.
No. 5 industrial fuel oil	3.38c.

	Per Gal. f.o.b. Cleveland
No. 3 distillate	5.50c.
No. 4 industrial	5.25c.
No. 5 industrial	4.50c.

REFRACTORIES

Fire Clay Brick

	Per 1000 f.o.b. Works: High-heat Duty Brick	Intermediate Duty Brick
Pennsylvania	$45.00	$40.00
Maryland	45.00	40.00
New Jersey	55.00	43.00
Ohio	45.00	40.00
Kentucky	45.00	40.00
Missouri	45.00	40.00
Illinois	45.00	40.00
Ground fire clay, per ton	7.00	

Chrome Brick

	Per Net Ton
Standard size	$45.00

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$45.00
Chicago	54.00
Birmingham	55.00
Silica clay, per ton	8.00

Magnesite Brick

	Per Net Ton
Standard sizes, burned, f.o.b. Baltimore and Chester, Pa.	$65.00
Unburned, f.o.b. Baltimore	55.00
Imported grain magnesite, f.o.b. Baltimore and Chester, Pa.	45.00
Domestic grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Domestic, f.o.b. Chewelah, Wash.	22.00

Warehouse Prices for Steel Products

PITTSBURGH

Base per Lb.

Plates	3.15c.
Structural shapes	3.15c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.90c.
Cold-finished and screw stock—	
Rounds and hexagons	*3.45c.
Squares and flats	*3.45c.
Hoops and bands under ¾ in.	3.20c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.30c.
Galv. sheets (No. 24), 25 or more bundles	3.95c.
Hot-rolled sheets (No. 10)	2.95c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	$3.69
Spikes, large	2.90c.
Track bolts, all sizes, per 100 count, 65 per cent off list.	
Machine bolts, 100 count, 65 per cent off list.	
Carriage bolts, 100 counts, 65 per cent off list.	
Nuts, all styles, 100 count, 65 per cent off list.	
Large rivets, base per 100 lb.	$3.50
Wire, black, soft ann'l'd, base per 100 lb.	*2.70c.
Wire, galv. soft, base per 100 lb.	*2.925c.
Common wire nails, per keg	*2.834c.
Cement coated nails, per keg	*2.834c.

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applied to orders of 400 to 999 lb.

*Delivered in Pittsburgh switching district.

CHICAGO

Base per Lb.

Plates and structural shapes	3.20c.
Soft steel bars	2.95c.
Cold-fin. steel bars and shafting	
Rounds and hexagons	3.50c.
Flats and squares	3.50c.
Hot-rolled strip	3.30c.
Hot-rolled annealed sheets (No. 24)	3.85c.
Galv. sheets (No. 24)	4.55c.
Hot-rolled sheets (No. 10)	3.05c.
Spikes (9/16 in. and lighter)	3.50c.
Track bolts	4.65c.
Rivets, structural (keg lots)	3.50c.
Rivets, boiler (keg lots)	3.60c.

Per Cent Off List

Machine bolts	60 and 5
Carriage bolts	60 and 5
Coach and lag screws	60 and 5
Hot-pressed nuts, sq. tap. or blank	60 and 5
Hot-pressed nuts, hex. tap or blank	60 and 5
Hex. head and cap screws	80
Cup point set screws	70 and 10
Flat head bright wood screws	37½ and 10
Spring cotters	50
Stove bolts in full packages	70 and 10
Rd. hd. tank rivets, 7/16 in. and smaller	57½
Wrought washers	$4.50 off list
No. 8 black ann'l'd wire per 100 lb.	$3.85
Com. wire nails, base per keg	3.05c.
Cement c't'd nails, base per keg	3.05c.

NEW YORK

Base per Lb.

Plates, ¼ in. and heavier	3.40c.
Structural shapes	3.37c.
Soft steel bars, small shapes	3.22c.
Iron bars	3.22c.
Iron bars, swed. charcoal	6.50 to 7.25c.
Cold-fin. shafting and screw stock;	
Rounds and hexagons	3.92c.
Flats and squares	4.42c.
Cold-roll. strip, soft and quarter hard	3.32c.
Hoops	3.52c.
Bands	3.52c.
Hot-rolled sheets (No. 10)	3.27c.
Hot-rolled ann'l'd sheets (No. 24*)	3.85c.
Galvanized sheets (No. 24*)	4.50c.
Long terne sheets (No. 24)	5.20c.
Standard tool steel	11.00c.
Wire, black annealed (No. 10)	3.25c.
Wire, galv. (No. 10)	3.85c.
Tire steel, 1 x ½ in. and larger	3.65c
Open hearth spring steel	4.00c. to 10.00c.
Common wire nails, base, per keg	$3.21

Per Cent Off List

Machine bolts, cut thread:	
Up to 1 in. dia. inclusive	60
Over 1 in. dia.	50
Carriage bolts, cut thread:	
Up to ½ in. dia. inclusive	60
Over ½ in. dia.	50

Per 100 Ft.

Boiler tubes:	
Lap welded, 2-in.	$18.05
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.94
Charcoal iron, 4-in.	63.65

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST. LOUIS

Base per Lb.

Plates and struc. shapes	3.44c.
Bars, soft steel or iron	3.19c.
Cold-fin. rounds, shafting, screw stock	3.74c.
Hot-rolled annealed sheets (No. 24)	4.09c
Galv. sheets (No. 24)	4.79c.
Hot-rolled sheets (No. 10)	3.29c.
Black corrug. sheets (No. 24)	4.09c.
*Galv. corrug. sheets	4.79c.
Structural rivets	3.99c.
Boiler rivets	4.09c.

Per Cent Off List

Tank rivets, 7/16 in. and smaller	55
Machine and carriage bolts, lag screws, fittings up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts	
1000 lb. or over	60
200 to 999 lb.	55 and 5
100 to 199 lb.	50 and 5
Less than 100 lb.	50

*No. 26 and lighter take special prices.

PHILADELPHIA

Base per Lb.

*Plates, ¼-in. and heavier	2.95c.
*Structural shapes	2.95c.
*Soft steel bars, small shapes, iron bars (except bands)	2.90c.
‡Reinforc. steel bars, sq. twisted and deformed	2.955c.
Cold-finished steel bars	3.73c.
*Steel hoops	3.40c.
*Steel bands, No. 12 and 3/16 in., incl.	3.15c.
Spring steel	5.00c.
†Hot-rolled anneal. sheets (No. 24)	3.55c.
†Galvanized sheets (No. 24)	4.25c.
*Hot-rolled annealed sheets (No. 10)	3.05c.
Diam. pat. floor plates, ¼ in.	4.95c.
Swedish iron bars	6.25c.

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 50 bundles or over.

‡For less than 2000 lb.

CLEVELAND

Base per Lb.

Plates and struc. shapes	3.31c.
Soft steel bars	2.95c.
Reinforc. steel bars	*2.10c.
Cold-finished steel bars	3.40c.
Flat-rolled steel under ¾ in.	3.30c.
Cold-finished strip	†3.00c.
Hot-rolled annealed sheets (No. 24)	3.96c.
Galvanized sheets (No. 24)	4.61c.
Hot-rolled sheets (No. 10)	3.11c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.56c.
Black ann'l'd wire, per 100 lb.	$2.65
No. 9 galv. wire, per 100 lb.	3.00
Com. wire nails, base per keg	2.40

*Plus mill, size and quantity extras.

†Outside delivery 10c. less.

CINCINNATI

Base per Lb.

Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.15c.
New billet reinforc. bars	3.25c.
Rail steel reinforc. bars	3.25c.
Hoops and bands, 3/16 in. and lighter	3.45c.
Cold-finished bars	3.70c.
Hot-rolled annealed sheets (No. 24)	4.00c.
Galv. sheets (No. 24)	4.70c.
Hot-rolled sheets (No. 10)	3.20c.
Structural rivets	4.35c.
Small rivets	55 per cent off list
No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over)	$2.91
Com. wire nails, base per keg (1 to 24 kegs)	3.50
25 to 50 kegs	3.30
Larger quantities	3.10
Cement c't'd nails, base 100-lb. keg	3.50
Chain, 1-in., per 100 lb.	8.35

Net per 100 Ft.

Seamless steel boiler tubes, 2-in.	$19.03
4-in.	44.96
Lap-welded steel boiler tubes, 2-in.	18.10
4-in.	42.22

BUFFALO

Base per Lb.

Plates	3.37c.
Struc. shapes	3.25c.
Soft steel bars	3.00c.
Reinforcing bars	2.60c.
Cold-fin. flats and sq.	3.55c.
Round and hex.	3.55c.
Cold-rolled strip steel	3.39c.
Hot-rolled annealed sheets (No. 24)	4.95c.
Heavy hot-rolled sheets, 3/16 in., 24 to 48 in. wide	3.62c.
Galv. sheets (No. 24)	4.65c.
Bands	3.42c.
Hoops	3.42c.
Hot-rolled unannealed sheets	3.17c.
Com. wire nails, base per keg	$3.35
Black wire, base per 100 lb.	3.45c.

BOSTON

Per Lb.

Beams, channels, angles, tees, zees	3.52c.
H beams and shapes	3.52c.*
Plates—sheared, tank and univ. mill, ¼ in. thick and heavier	3.52c.*
Floor plates, diamond pattern	5.33c.
Bar and bar shapes (mild steel)	3.30c.
Bands 3/16 in. thick and No. 12 ga. incl.	3.60c to 4.60c.
Half rounds, half ovals, ovals and bevels	4.55c.
Tire steel	4.55c.
Cold-finished rounds and hexagons	5.25c.*
Cold-rolled strip steel	3.245c.
Cold-finished squares and flats	5.75c.
Blue annealed sheets, No. 10 gal.	3.60c.
One pass cold-rolled sheets No. 24 ga.	4.15c.
Galvanized steel sheets, No. 24 ga.	4.85c.
Lead coated sheets, No. 24 ga.	5.80c.

Prices delivered by truck in metropolitan Boston, subject to quantity differentials.

*Base.

PACIFIC COAST

Base per Lib.

	San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	3.55c.	3.70c.	3.55c
Shapes, standard	3.55c.	3.70c.	3.55c.
Soft steel bars	3.60c.	3.70c.	3.55c.
Reinforcing bars	3.50c.	3.50c.	3.50c.
Hot-rolled annealed sheets (No. 24)	4.40c.	4.45c.	4.40c.
Hot rolled sheets (No. 10)	3.75c.	3.80c.	3.75c
Galv. sheets (No. 24)	5.00c.	5.05c.	5.00c.
Cold finished steel			
Rounds	5.95c.	5.95c.	4.75c.
Squares and hexagons	7.20c.	7.20c.	6.00c.
Flats	7.70c.	7.70c.	7.00c.
Common wire nails —base per keg less carload	$3.40	$3.25	$3.35

All items subject to differentials for quantity.

August Shipments of Steel Corporation Increase Slightly Over July Movement

AUGUST shipments of steel products by the United States Steel Corpn. amounted to 378,023 tons, a fractional increase over the 369,938 tons reported for the preceding month. June shipments were 985,337 tons, while the corresponding movement in August, 1933, was 668,155 tons.

The past month's total was sufficient to engage the corporation's steel finishing capacity at 23.1 per cent.

MONTHLY SHIPMENTS OF STEEL PRODUCTS BY UNITED STATES STEEL CORPN.

Month	1930	1931	1932	1933 Shipments	1933 Per Cent of Capacity	1934 Shipments	1934 Per Cent of Capacity
January	1,104,168	800,031	426,271	285,138	17.7	331,777	19.8
February	1,141,912	762,522	413,001	275,929	18.5	385,500	26.3
March	1,240,171	907,251	388,579	256,793	15.3	588,209	36.6
April	1,188,456	878,558	395,091	335,321	21.6	643,009	41.5
May	1,203,916	764,178	338,202	455,302	27.1	745,063	44.4
June	984,739	653,104	324,746	603,937	37.4	985,337	61.2
July	946,745	593,900	272,448	701,322	45.1	369,938	23.0
August	947,402	573,372	291,688	668,155	39.8	378,023	23.1
September	867,282	486,928	316,019	575,161	35.6	.....	...
October	784,648	476,032	310,007	572,897	35.5	.....	...
November	676,016	435,697	275,594	430,358	26.7	.....	...
December	579,098	351,211	227,576	600,639	38.7	.....	...
Plus yearly adjustment	(40,259)	(6,040)	(5,160)	(44,283)	...	.....	...
Total for year	11,624,294	7,676,744	3,974,062	5,805,235	30.1	.....	...

Lead and Spelter Prices Decline—Copper Market Continues Inactive

Tin Consumers Remain Out of the Market as Prices Tend Lower—European Copper Quotations Still Falling

NEW YORK, Sept. 11.—The copper market has remained in its characteristically dull state since the mild buying flurry before Labor Day. Sellers are taking occasional carlot orders and sales of principal primary sources are scarcely amounting to 100 tons daily. The price, of course, is holding at 9c. a lb., delivered Connecticut valley. Most users of copper are under contract for at least the next six weeks and the generally uncertain state of general business would not tend to lead to additional commitments. The European market continues very weak. Prices have declined steadily in the last week and the current quotation of 6.90c. a lb., c.i.f., usual Continental base ports, is the lowest since the establishment of the copper code led to a wide disparity between European and United States prices.

Tin

In a week of very light transactions, price fluctuations were at a minimum, with quotations on a somewhat lower level. Tin plate makers are showing little disposition to make further commitments, although their operating rates have held up much better than had been anticipated. The uncertainties of foreign exchange are possibly holding business back, but until today, the English pound had hovered around the $5 level for nearly a week. It rose to $5.02 this morning, and tin is currently quoted at 51.37½c. a lb. In the London market today's prices on first call were £228 and £226 7s. 6d. for spot and future standard respectively, and £228 5s. for Straits at Singapore. United Kingdom warehouse stocks increased only slightly in the last week, having amounted to 3749 tons on Sept. 8. Prompt tin is relatively scarce and the statistical position of the market is considered satisfactory.

Zinc

Reduction of another five points in the price of Prime Western on Friday improved the week's sales a little, but not enough to enliven the market particularly. The past week's bookings were only about 1500 tons, as compared with 1300 tons in the previous camparable period, but only 600 tons in the week before. Last week's prices ranged from 4.15c. to 4.20c. a lb., East St. Louis, and the market today is still at the lower level for deliveries extending over the remainder of the year. The usual differential prevails at New York. Publication of August statistics revealed shipments of 21,659 tons, compared with production of 26,269 tons, which resulted in an increase of 4610 tons in all grades of smelters' stocks. August shipments were the lowest since April, 1933, and are traceable partially to the low rate of steel operations during the month. Unfilled orders on smelters, books on Aug. 31, totaled 14,281 tons, a decline of 1800 tons from the corresponding July figure. In line with the decline in the spelter market Joplin ore producers reduced their prices $1 a ton on Saturday, the market now being quotable at $24 a ton for flotation and $25 for mill grades.

Lead

A number of sellers reduced prices 5c. a lb. late Thursday and that day's bookings were considerably increased. Lead is now quotable at 3.70c. a lb., New York, and 3.55c., St. Louis, and the greater part of available September metal has now been booked. October is probably 60 per cent sold. General business uncertainty is undoubtedly contributing to the market inactivity which can only be partially changed by price reductions. The lead ore market has also been marked down and is now quotable at $34 a ton for small lots and $36.50 for large quantities. Stocks at the end of the week were estimated at 13,500 tons.

The Week's Prices. Cents Per Pound for Early Delivery

	Sept. 6	Sept. 7	Sept. 8	Sept. 10	Sept. 11
Electrolytic copper, N. Y.*	8.75	8.75	8.75	8.75	8.75
Lake copper, N. Y.	9.12½	9.12½	9.12½	9.12½	9.12½
Straits tin, Spot, N. Y.	51.40	51.25		51.35	51.37½
Zinc, East St. Louis	4.20	4.15	4.15	4.15	4.15
Zinc, New York	4.55	4.50	4.50	4.50	4.50
Lead, St. Louis	3.55	3.55	3.55	3.55	3.55
Lead, New York	3.70	3.70	3.70	3.70	3.70

*Refinery quotations: price ¼c. higher delivered in Connecticut.

Aluminum, 98-99 per cent, 22.90c. a lb., delivered; new No. 12, 20.00c. a lb., delivered.
Aluminum, remelt No. 12 (alloy), carload lots delivered, 15.50c. a lb., average for week.
Nickel electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.
Antimony, 7.15c. a lb., New York.
Brass ingots, 85-5-5-5, 8.25c. a lb., New York and Philadelphia.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	54.00c. to 55.00c.
Tin, bar	56.00c. to 57.00c.
Copper, Lake	10.25c. to 11.00c.
Copper, electrolytic	10.00c. to 10.50c.
Copper, castings	9.75c. to 10.75c.
*Copper sheets, hot-rolled	16.00c.
*High brass sheets	14.50c.
*Seamless brass tubes	17.00c.
*Seamless copper tubes	17.25c.
*Brass rods	13.00c.
Zinc, slabs	5.75c. to 6.75c.
Zinc sheets (No. 9), casks, 1200 lb. and over	10.25c.
Lead, American pig	4.50c. to 5.50c.
Lead, bar	5.50c. to 6.50c.
Lead, sheets	7.50c.
Antimony, Asiatic	10.00c.
Alum., virgin, 99 per cent, plus	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent	18.00c. to 19.00c.
Solder, ½ and ½	32.00c. to 33.00c.
Babbitt metal, commercial grades	25.00c. to 60.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	55.25c.
Tin, bar	33.50c.
Copper, Lake	10.00c.
Copper, electrolytic	10.00c.
Copper, castings	9.75c.
Zinc, slab	5.75c. to 6.00c.
Lead, American pig	4.75c. to 5.00c.
Lead, bar	7.75c.
Antimony, Asiatic	9.00c.
Babbitt metal, medium grade	18.50c.
Babbitt metal, high grade	59.25c.
Solder, ½ and ½	33.50c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	6.25c.	7.00c.
Copper, hvy. and wire	6.00c.	6.75c.
Copper, light and bottoms	5.00c.	5.87½c.
Brass, heavy	3.25c.	3.87½c.
Brass, light	2.87½c.	3.50c.
Hvy. machine composition	4.75c.	5.25c.
No. 1 yel. brass turnings	4.37½c.	5.12½c.
No. 1 red brass or compos. turnings	4.25c.	5.25c.
Lead, heavy	2.87½c.	3.37½c.
Zinc	2.25c.	3.00c.
Cast aluminum	9.62½c.	10.75c.
Sheet aluminum	11.00c.	12.50c.

Non-Ferrous Averages

THE average prices of the major non-ferrous metals for August, based on daily quotations in THE IRON AGE, are as follows:

	Average
Electrolytic copper, N. Y.*‡	8.75c. a lb.
Lake copper, Eastern delivery*	9.12½c. a lb.
Straits, tin, Spot, N. Y.	51.99c. a lb.
Zinc, East St. Louis	4.28c. a lb.
Zinc, New York	4.63c. a lb.
Lead, St. Louis	3.60c. a lb.
Lead, New York	3.75c. a lb.

*Blue Eagle copper. ‡ Price ¼c. higher in Connecticut Valley.

Boston Scrap Trade Feels Textile Strike

BOSTON, Sept. 11.—The local pig iron and scrap markets are quiet. Exporters are doing virtually no buying of No. 2 steel and there is no market for any kind of scrap for Pittsburgh delivery, while the movement of chemical borings has come to a standstill as a direct result of the textile strike. Occasionally a broker will buy a car of No. 2 steel against old contracts for Worcester, Mass., at a price equivalent to around $7 a ton, delivered, and a Phillipsdale, R. I., mill will purchase car of No. 1 steel at $7.25 a ton, delivered.

The foundry industry is in the doldrums. One of the most active local pig iron brokers reports 1934 sales to date as not more than 60 per cent of those for the same period in 1933. Other furnace representatives have been less fortunate. Consequently current indications are that final 1934 sales will be the smallest for many years and possibly the smallest on record.

Steel Output Unchanged At Buffalo

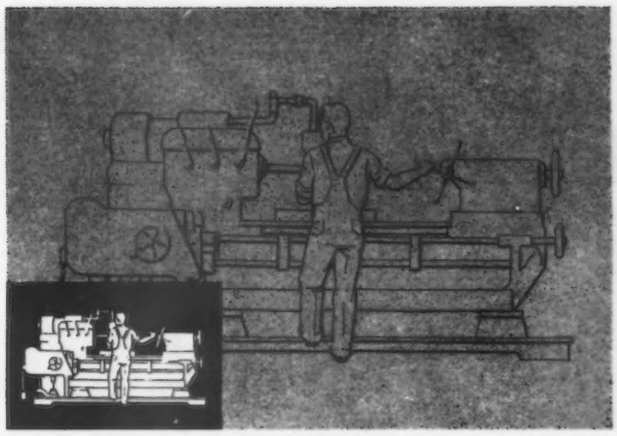
BUFFALO, Sept. 11.—The expected September pickup in pig iron business has not yet materialized. Conditions remain as they were during August, with only an occasional carload or 100-ton sale.

Steel works operations remain unchanged, with three open-hearths active at Bethlehem's Lackawanna plant; three at Republic Steel Corpn. and one at Wickwire-Spencer Steel Corpn. The Seneca sheet division of Bethlehem is running at about 15 per cent of capacity.

All structural fabricating plants report considerable small business in 5 and 10-ton lots, but the major inquiries are meager. Holmes & Murphy, general contractors, are low on a 200-ton State highway bridge job at Holland, N. Y., but the steel has not yet been awarded.

The scrap market is somewhat livelier, with a sale of 200 tons of No. 2 heavy melting steel to one of the mills at a reported price of $8.75. Occasional sales of No. 1 machinery cast at $10 and short rails at $12.50 are noted.

The National Canner's Association has recently issued a booklet entitled. "The Story of the Tin Can." It is stated that 1,150,000 tons of tin plate is used annually for cans of all kinds. Measured another way it is 5,000,000,000 sq. ft. of tin plate. To make this plate there is required 1,692,000 tons of steel ingots, representing 1,880,000 tons of pig iron, which in turn requires 3,420,000 tons of 55 per cent iron ore.



WYCKOFF

COLD DRAWN STEELS

reduce machining costs

If your problem involves the rapid duplication of machined steel parts at lowest cost, WYCKOFF Cold Drawn Steels will serve you well.

Precision methods of manufacture combined with scientific time and temperature control assure constant uniformity in all WYCKOFF Cold Drawn Steels.

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Turned and Polished Shafting Turned and Ground Shafting

Pipe Lines

Lone Star Gas Co., Dallas, Tex., Frank L. Chase, vice-president and general manager, plans 12-in. welded steel pipe line from natural gas field at Long Lake, Anderson County, to connection with main trunk line system near Waco, Tex., about 75 miles, with branch lines for service to number of communities along route. Completion is scheduled in 60 to 90 days. Cost about $900,000.

General Purchasing Officer, Panama Canal, Washington, asks bids until Sept. 27 for 54,720 ft. steel pipe, alternate bids on wrought iron (Schedule 2996).

Alhambra, Cal., let contract to Southern Pipe & Casing Co., Azusa, Cal., for 12 and 16-in. for main water service, at $5,199.01.

Colorado Springs, Colo., will soon ask bids for steel pipe line to Broadmoor, North and South Cheyenne canyon districts, for gas distribution. Fund of $30,000 has been secured through Federal aid.

Columbia Natural Gas Co., 545 William Penn Way, Pittsburgh, plans 6-in. steel pipe line across Kiskiminetas River, near Leechburg, Pa. Federal permission has been asked.

Zachary, La., asks bids until Sept. 29 for natural gas steel pipe line system, totaling about 39,000 ft. of 1 and 2-in. pipe, welded joints, service connections, etc. S. E. Huey, Ouachita National Bank Building, Monroe, La., is consulting engineer.

Fabricated Structural Steel

Lettings Again Lower—New Projects in Fair Volume

BOOKINGS of structural steel, at 8900 tons, are mostly in small lots and compare with 9200 tons last week. The largest award is 1100 tons for a city hospital addition in Boston. New projects of 16,000 tons are less than one-half of the tonnage reported a week ago. Included in new jobs is 8000 tons for a parcel post building in Boston and 4000 tons for the Farnum Street bridge in Omaha, Neb. Plate awards total more than 1500 tons. Structural steel lettings for the week follow:

NORTH ATLANTIC STATES

Milton, Mass., 235 tons, junior high school, to New England Structural Co.

Boston, 1100 tons, city hospital additions, to New England Structural Co.

Boston, 125 tons, coal handling plant, to New England Structural Co.

South Boston, Mass., 110 tons, conveyor trestle, to New England Structural Co.

Oceanside, N. Y., 200 tons, high school, to Bethlehem Fabricators, Inc.

Cold Spring, N. Y., 140 tons, grade and high school, to Bethlehem Fabricators, Inc.

Newark, N. J., 120 tons, lintels for Prudential apartments, to Ingalls Iron Works Co.

Bedford County, Pa., 220 tons, State highway bridge, to American Bridge Co.

Whitehall, Md., 285 tons, crusher plant, to Belmont Iron Works.

Washington, 400 tons, radio towers for Department of Commerce, to Blaw-Knox Co.

SOUTH AND SOUTHWEST

Alexandria, Va., 120 tons, high school, to Dietrich Brothers.

Licking River, Ky., 715 tons, bridge, to R. C. Mahon Co.; 160 tons of sheet piling, to Temple Foundation Co., Cincinnati.

Louisville, Ky., 250 tons, building, to Jones & Laughlin Steel Corpn.

State of Arkansas, 480 tons, highway bridges, to J. B. Klein Iron & Foundry Works Co.

CENTRAL STATES

Coshocton County, Ohio, 480 tons, highway bridge, to Lackawanna Steel Construction Co.

Toledo, Ohio, 900 tons, Y. M. C. A. building, to R. C. Mahon Co.

Ludington, Mich., 140 tons, State highway bridge, to Flint Structural Steel Co.

Chicago, 180 tons, bridge for Milwaukee Road, to Milwaukee Bridge Co.

Pike County, Ill., 120 tons, State highway bridge, to Illinois Steel Bridge Co.

Shelby, Iowa, 255 tons, State highway bridge, to Des Moines Steel Co.

Fort Dodge, Iowa, 100 tons, Tobin Packing Co., to Des Moines Steel Co.

Lake Forest, Ill., 400 tons, high school building, to an unnamed fabricator.

Germantown, Ill., 465 tons, bridge, to American Bridge Co.

Chilton, Wis., 100 tons, bridge, to Vulcan Mfg. Co.

State of Nebraska, 300 tons, highway bridges, to Omaha Steel Works.

WESTERN STATES

Boulder City, Nev., 500 tons, cranes for Boulder Canyon, to Shaw Box Co.

Yellowstone National Park, Wyo., 100 tons, Bureau of Public Roads bridge, to an unnamed bidder.

Los Angeles, 255 tons, bridge over Los Angeles River, to Consolidated Steel Corpn.

San Francisco, 205 tons sheet piling, piers 38 and 40 on Trans-Bay bridge, to Pacific Coast Steel Corpn.

Colton, Cal., 100 tons, high school gymnasium, to Kyle Steel Construction Co.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Worcester, Mass., 200 tons, Cambridge Street bridge.

Boston, 8000 tons, parcel post building.

Lawrence, N. Y., 700 tons, high school building.

New York, 4500 tons, pier shed No. 32, foot of Canal Street, Hudson River; Kenny Brothers, Inc., New York, low bidder on general contract.

Niagara Falls, N. Y., 150 tons, building for Acheson Graphite Co.

Washington, 3000 tons, Internal Revenue building extension; bids Sept. 20.

Lackawanna County, Pa., 380 tons, State highway bridge; bids Sept. 21.

CENTRAL STATES

State of Minnesota, 500 tons, highway bridges.

Trempealeau, Wis., 1500 tons, permanent piling for Dam No. 6; bids Oct. 2.

Madison, Wis., 650 tons, four bridges in Dunn County; bids Sept. 25.

Washington, Mo., 2850 tons, superstructure for vehicular bridge; McClintic-Marshall Corpn. low bidder.

Omaha, Neb., 4000 tons, Farnum Street bridge.

WESTERN STATES

McGill, Nev., 275 tons, Nevada Consolidated Copper Co.

Lodi, Cal., 100 tons, post office; bids soon.

Hueneme, Cal., 400 tons, transit shed; bids soon.

Clackamas County, Ore., 100 tons, State bridge over Deep Creek; bids under advisement.

Lualualei, T. H., 300 tons, Naval radio station; bids under advisement.

France Field, Canal Zone, 250 tons, hangar at Army base; bids Sept. 26.

FABRICATED PLATE

AWARDS

Quincy, Mass., 100 tons, standpipe and elevated tank to Pittsburgh-Des Moines Steel Co.

Danvers, Mass., 100 tons, tank and tower to Chicago Bridge & Iron Works.

Reading, Pa., 330 tons, standpipe for city, to Pittsburgh-Des Moines Steel Co.

Washington, 510 tons, pipe line for District of Columbia; from Interstate Engineering Co., Baltimore, to Alco Products Co., New York.

Richmond, Cal., 500 tons, bubble towers for Standard Oil Co., to Western Pipe & Steel Co.

NEW PROJECTS

Erie Railroad, 500 tons, ferry boat.

Magic, Idaho, 175 tons, pipe and gates at Magic Dam; bids under advisement.

Cast Iron Pipe

Boston has awarded about 400 tons of 16, 42 and 48-in. pipe and special castings to Warren Foundry & Pipe Co.

Concord, N. H., has awarded 100 tons of 8-in. to United States Pipe & Foundry Co.

Wilmington, Mass., has placed 100 tons of 10-in. with Warren Foundry & Pipe Co.

Board of Public Service, St. Louis, plans new pipe line from Stacy Park reservoir to connection with city mains, about 13 miles, for water trunk line. Cost about $1,000,000, of which fund $360,000 has been secured through Federal aid.

Springfield, Ill., plans about eight city blocks of 16-in. for main trunk line water supply. Financing is being arranged through Federal aid.

Appleton, Wis., opens bids Sept. 17 for 2900 ft. of 6 and 8-in. centrifugal pipe, and for quantity of fittings.

Danville, Va., closed bids Sept. 10 for 35,726 ft. of 6, 8, 10 and 16-in.; also for 7125 ft. 1½-in. galvanized pipe, for extensions in water system. Fund of $85,000 arranged for work.

Santa Barbara, Cal., plans extensions in water pipe line. Cost about $27,500. Victor H. Trace is water superintendent.

Shawnee Township Committee, care of L. C. Maddox, 2216 South Twenty-sixth Street, Kansas City, Kan., will soon take bids for water pipe line from Turner district to Rosedale, by way of Crestline Garden and Kinney Heights. Cost $215,000. Charles A. Haskins & Co., Finance Building, Kansas City, Mo., are consulting engineers.

Santa Anna, Tex., plans new 10-in. for water trunk line. Special election is called for Sept. 25 to approve bonds for $25,000 for this and other waterworks improvements.

Levan, Utah, plans water pipe line, replacing present wooden mains. Fund of $35,000 has been secured through Federal aid. Caldwell & Richards, Templeton Building, Salt Lake City, Utah, are consulting engineers.

Kenesaw, Neb., closed bids Sept. 7 for 11,952 ft. of 2 and 4-in. for water lines. Henningson Engineering Co., Union State Bank Building, Omaha, Neb., is consulting engineer.

Lenoir, N. C., let contract to Lynchburg Foundry Co., Lynchburg, Va., for 33,000 ft. of 6 and 10-in. for water system.

Altus, Okla., plans about 7650 ft. of 6-in. for water line.

Frederic, Wis., asks bids until Sept. 21 for different sizes, for water lines. P. R. Banister, Hudson, Wis., is consulting engineer.

Billings, Mont., will soon have plans for water pipe line extensions. Black & Veatch, Mutual Building, Kansas City, Mo., are consulting engineers.

Chehalis, Wash., has awarded 850 tons of 4 to 14-in. to United States Pipe & Foundry Co.

Santa Monica, Cal., will take bids Sept. 17 on 147 tons of 4 and 6-in.

Williams, Ariz., will take bids Sept. 17 on 475 tons.

Kaukauna, Wis., has placed 1500 lin. ft. of 6-in. with James B. Clow & Sons.

Stratford, Wis., contemplates new water supply requiring 4000 lin. ft. of 6 and 8-in.

Escanaba, Mich., plans water main extensions to cost about $47,000.

Frederic, Wis., closes bids Sept. 21 on improvements to waterworks system costing about $25,000.

Reinforcing Steel

Awards 1575 Tons—New Projects 4700 Tons

New York, 300 tons, grade separation in Queens, to Truscon Steel Co.

State of New York, 500 tons, mesh; 300 tons in Genesee and Livingston counties, to American Steel & Wire Co., and 200 tons in Tompkins County, to Wickwire-Spencer Steel Co.

Licking River, Ky., 475 tons, bridge, to Temple Foundation Co., Cincinnati.

Battle Creek, Mich., 300 tons, elevator, to Inland Steel Co.

NEW REINFORCING BAR PROJECTS

New York, approximately 2000 tons, foundations for United States Federal Office Building; bids Oct. 2.

Cedar Rapids, Iowa, 215 tons, sewage disposal plant.

Riverdale, Ill., 220 tons, Acme Steel Co.

Moline, Ill., 102 tons, school building; Lind Construction Co., Chicago, low bidder.

Decatur, Ill., 110 tons, post office; McDonald Construction Co., St. Louis, general contractor.

Springfield, Mo., 160 tons, drainage extension; bids to be opened Sept. 18; Russell & Axton, engineers, St. Louis.

Washington, Mo., 162 tons, superstructure for vehicular bridge; McClintic-Marshall Corpn., low bidder.

Washington, Mo., 167 tons, substructure for vehicular bridge; Missouri Valley Bridge & Iron Co. low bidder.

Fallon, Nev., 200 tons, city reservoir; bids under advisement.

Torrance, Cal., 100 tons, reconstruction of school; general contract awarded.

Long Beach, Cal., 200 tons, reconstruction of high school; bids under advisement.

Los Angeles, 350 tons, reconstruction of Russell and Garfield school.

Los Angeles, 600 tons, California Fruit Growers Exchange building; bids soon.

Los Angeles, 140 tons, St. Paul's chapel; bids under advisement.

Visalia, Cal., 100 tons, Ventura County hospital; bids under advisement.

Bonneville, Ore., 106 to 376 tons placing, railroad relocation; general contract awarded.

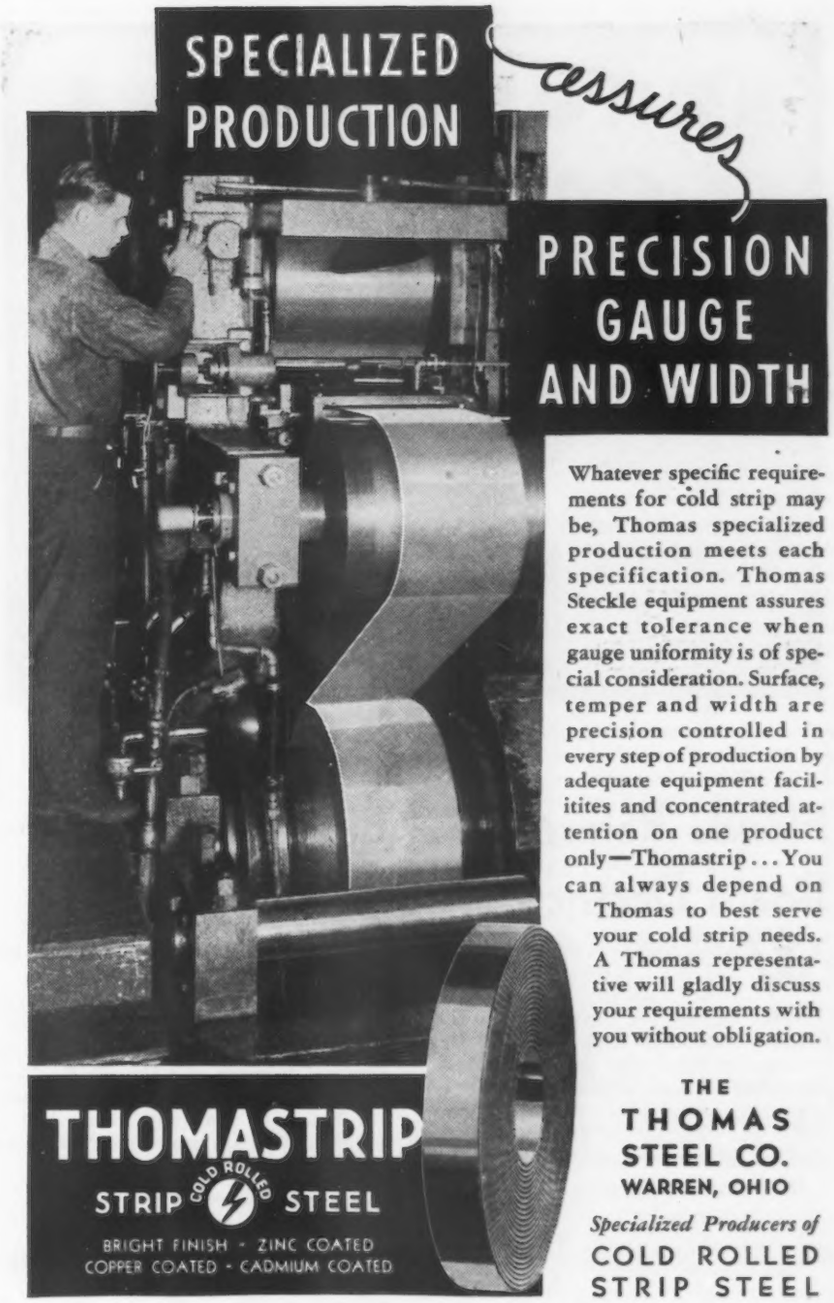
Bureau of Mines To Build Experiment Station

A PWA allotment of $200,000 for construction of a new Bureau of Mines experiment station building at the University of Alabama, Tuscaloosa, has been announced. The station serves the iron and steel and coal industries of the Southern states.

Western Branch of Mining Congress

THE annual convention of the Western Division, American Mining Congress, will be held at San Francisco the week of Sept. 24. Metal operators, engineers, miners, and equipment manufacturers alike are throwing their shoulders "against the wheel" in a cooperative effort to make many changes which demand immediate attention. Prominent among these is the question of the Bureau of Mines, around which all mining industries are rallying. Dr. F. A. Thomson, president, Montana School of Mines, University of Montana, will bring this question before the delegates with a discussion of "The Benefits to the Mining Industry by the United States Bureau of Mines Experimental Stations." Dr. John Wellington Finch, new director of the bureau succeeding Scott Turner, will be introduced at the convention and will deliver a paper.

Three round table discussions on imperative problems will feature one of the spotlights of the convention. The first, presided over by Howard I. Young, president, American Mining Congress, and president, American Zinc, Lead & Smelting Co., will be a discussion of: "The National Labor Relations Board: its personnel; functions; authority, real and implied; effect upon labor conditions; and its good and bad points." The second round table will be chairmaned by D. D. Moffat, vice-president, Utah Copper Co., and will discuss "Unemployment insurance and workman's compensation; Congressional proposals; labor organizations sponsoring attitude of Administration; and State laws." The third, and perhaps the most important of these discussions is that of the "NRA: its effect on the mining industry; good and bad points; shall it be permanent remedy; what should be kept and what discarded".



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Houde Refuses to Abide by Labor Board Decision—Court Test Indicated

WASHINGTON, Sept. 11.—The National Labor Relations Board today referred the Houde Engineering Corpn. case to the NRA compliance division with the recommendation that the division remove the company's Blue Eagle. It is also understood that the board may refer the case to the Department of Justice for prosecution.

The Houde company refused to abide by the majority rule decision of the board rendered last week.

The Houde case will probably be the test case involving Section 7a that will be carried to the Supreme Court.

The labor board's decision virtually nullified the proportional form of representation established by the President's automobile settlement of last March, under which the agents for each group of employees, majority as well as minority or minorities, would be entitled to bargain with their employers.

The automobile settlement had hardly been made last spring, in time to avert a strike, when organized labor attacked it.

When the Houde case came to the National Labor Relations Board, board members held up their decision for some months, pending the completion of an investigation. On Sept. 1 the board ruled that the representatives chosen by a majority of employees should be "the exclusive collective bargaining agency of all employees."

This decision nullified not only the automobile agreement but was also directly contrary to previous rulings by General Johnson and Donald R. Richberg, NRA general counsel. The latter had held that any group had a right to bargain collectively with an employer.

Skirmishes Scheduled In Unionization Campaign

FOLLOWING a conference with the National Steel Labor Relations Board on a complaint of employees of the Republic Steel Corpn., Warren, Ohio, it was announced Tuesday that briefs will be submitted by attorneys for the workers and the company.

The complaint, filed by Charlton Ogburn, as counsel for the Open-Hearth Lodge of the Amalgamated Association of Iron, Steel and Tin Workers, charged discrimination for union activity in the discharge or lay-off of 12 men and denial of collective bargaining rights.

M. F. Tighe, international president of Amalgamated, appeared with Mr. Ogburn in behalf of the complainants. Thomas F. Veach of Cleveland, counsel, and C. H. Elliott, manager of the Warren district, were among those representing the company. The Steel Board set Friday to hear complaints by workers in the Gulf States Steel Co. plant at Birmingham, Ala., that five men have been discharged for alleged union activity. The workers also allege a denial of collective bargaining rights.

The board has also postponed until the first week in October, hearing on the petition of employees of the McDonald, Ohio, plant of the Carnegie Steel Co. by members of the Buckeye Lodge, 174 Amalgamated association, requesting an election to determine collective bargaining representation. The hearing had been scheduled for Sept. 12 in Washington. The postponed hearing will be held in Pittsburgh.

Uncle Sam To Build World's Longest Fence

WASHINGTON, Sept. 11.—The largest requirement of the kind ever to be called for, the Forest Service, Department of Agriculture, is about to enter the market for an estimated total of 100,000 miles or approximately 165,000 tons of wire fencing in connection with a 1000-mile-long, 100-mile-wide shelter belt in the West extending from the Canadian to the Mexican border.

All the purchasing is to be made by the Forest Service at its offices in Lincoln, Neb., and it is expected that the first inquiry for wire fencing will come out in October and call for about 25,000 tons. In addition there will be large requirements of barbed wire, three strands of which probably will be placed over the fencing on each side of the belt. While most of the posts will be made of lumber, some will also be made of steel.

Already an allocation of $25,000,000 has been made in connection with the Government reforestation program, which will extend over a period of five years.

Scrap Market Still Quiet at Detroit

DETROIT, Sept. 11.—The local scrap market continues quiet with consumers uninterested in placing fresh orders and indifferent toward taking in shipments to complete present contracts. It is understood that a Buffalo scrap user has given releases for one cargo a month to be shipped by water from Detroit. The conviction is growing in local scrap circles that considerable tonnage now in storage here awaiting water shipment to Lake Erie ports probably will not be moved this season, remaining in local yards throughout the winter. Prices are unchanged.

George P. Torrence Discusses Confidence

IN the September issue of *Link-Belt News*, the attractive tabloid newspaper now being published by the Link-Belt Co., George P. Torrence, president of the company has written a timely editorial. It deals with the relation of the restoration of confidence to the recovery in durable or capital goods.

"Link-Belt Co.," says Mr. Torrence, "makes durable goods and is especially interested in 'durable goods' problems. Many of our customers, being also manufacturers of durable goods, have a common interest with us. Our customers who make consumptive goods will probably 'listen in,' as durable goods industries are the key logs in the recovery program jam. The breaking of the jam and the progress of durable goods industries are of vital concern to everyone.

"The durable goods industries committee stated in its report to the President: 'Confidence is the most important requisite to recovery. The President in his inaugural address, a year ago, pointed out that fear had almost paralyzed our nation. In normal times we seldom realize what a large part confidence, the converse of fear, plays in our economic life.'

"Uncertainties shake our confidence. Will undue restrictive control of investment prevent the large credit available from being used in business and industry? Will the Government so far invade business and industry as to destroy private business? [No enterprise can compete successfully with the Government.] Will the concept that the Government owes every one a living progress to the point where the majority of our people will wish to exchange their chance of a large success for a mediocre livelihood? Will the attitude toward labor relations be continued to the point where 'cooperation in a common enterprise' is no longer a motivating influence, and our society degenerates into selfish classes battling with one another for the spoils of industrial warfare?

"The answers pertaining to industry and business are not wholly in the hands of employees and management and owners. Others having no interest in industry and business, and little or no experience in either, are claiming the knowledge and ability to direct them and are attempting to dictate the answer to all our problems.

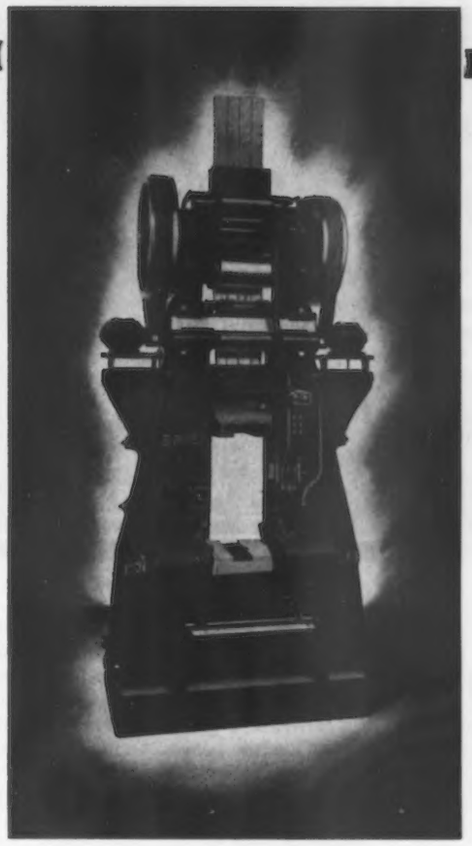
"Successful business and industrial enterprises are the source of livelihood for all citizens. Business and industry are the means of making and distributing the things every one wants, and therefore for bringing material well-being to the individual.

"Our Government never has operated business efficiently, and inefficient Government operation means lower standards of living for everybody. If it becomes certain that the intention of our present Government is to take over all business and industry, then employees, management and owners, will have to fight to retain their personal liberty. If such a course should be the intent of our Government, 'life, liberty, and the pursuit of happiness' would be in jeopardy.

"In defining the issue, it is well also to define the aims.

"President Roosevelt has stated his aims clearly. He is striving for the health, happiness and security of the people of the United States. In these aims all concur, and to achieve these aims, all enlisted under his banner. Now a year of arrested progress creates doubt of the methods selected by the President and his advisers. It is entirely appropriate that we analyze and criticize, and, if necessary, vigorously oppose any methods, if we believe them unlikely to achieve the President's aims. Particularly must interference with privately owned and controlled business and industry be opposed, if we continue to believe that they are the proper means for achieving the health, happiness and security of the people of the United States."

"Time to Retire"



When is it time to retire a hammer? When it absolutely won't run any more, or when it costs more to produce forgings on it than on a new "Improved ERIE"? You don't wait to pension a man, until he drops dead. With the machine, as with the man, there comes a time when production drops off, lost time and lack of dependability become serious, and presence in the shop is a menace to the safety of others.

You have some old timers in your shop that should be scrapped to give their places to modern ERIE Hammers and Presses. You'll be money ahead for doing it. Compare the latest ERIE designs with your present equipment. That's the first step toward making money in your forge shop.

When at a Century of Progress in Chicago see the ERIE hammer and press operating at the Chrysler Motors exhibit.

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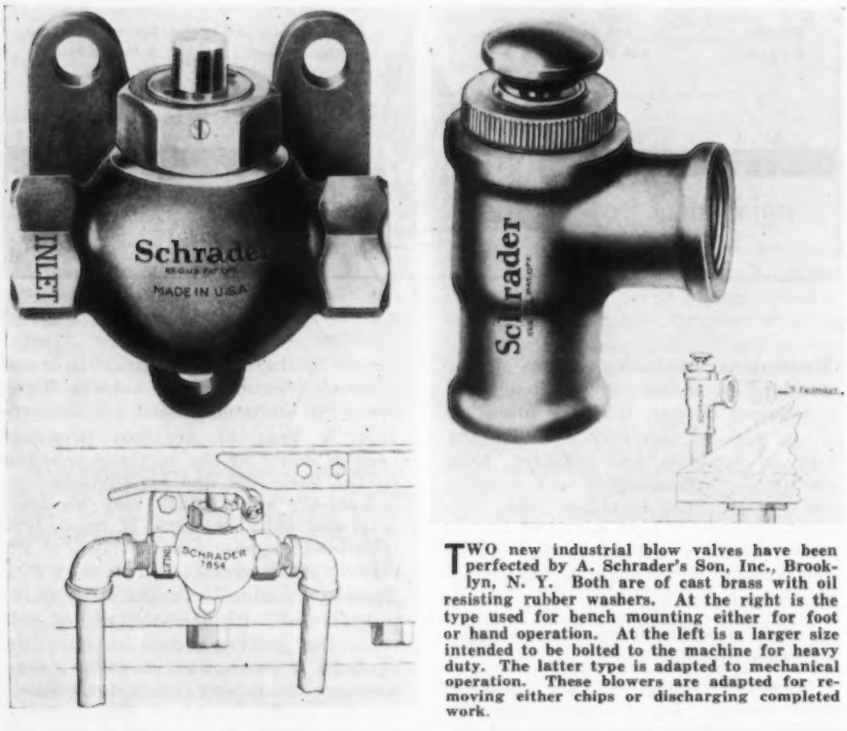
Quantity Extras On Plates To Be Changed

QUANTITY extras on steel plates become applicable Oct. 1, according to the new book of extras just issued by the American Iron and Steel Institute. In Colorado, Montana, New Mexico, Utah, Wyoming, Texas, Oklahoma, Idaho, Arizona, Arkansas, Louisiana, South Atlantic ports and other States where Birmingham base prices plus all rail-published freight rate would determine the lowest all-rail delivered prices, as well as on sales based upon Gulf Port prices, item extras, in cents per lb. for each commodity, will apply, regardless of quality, for shipment at one time and to one destination. Calculated theoretical weight will govern for determining the extra or extras to apply. The following extras will apply and will be determined by group thickness or group weight per sq. ft.:

1999 lb. to 1000 lb.	0.25c.
999 lb. and less	0.50c.

In territories other than the Birmingham and Mid-West, item extras in cents per lb. for each commodity, regardless of quality, for shipment at one time and to one destination, will also apply. Calculated theoretical weight will also govern in determining the extras, according to group thickness and group weight per sq. ft., but the extras will be as follows:

5999 lb. to 4000 lb.	0.10c.
3999 lb. to 2000 lb.	0.20c.
1999 lb. to 1000 lb.	0.50c.
999 lb. and less	1.00c.



TWO new industrial blow valves have been perfected by A. Schrader's Son, Inc., Brooklyn, N. Y. Both are of cast brass with oil resisting rubber washers. At the right is the type used for bench mounting either for foot or hand operation. At the left is a larger size intended to be bolted to the machine for heavy duty. The latter type is adapted to mechanical operation. These blowers are adapted for removing either chips or discharging completed work.

Amalgamated Wins Election at Huntington

THE Amalgamated Association of Iron, Steel and Tin Workers last week gained its first victory under the first Federal sponsored steel labor election at the West Virginia Rail Co. plant, Huntington, W. Va. John F. Dewey, Federal labor department conciliator, who supervised the election, reported that 237 votes were cast for the Amalgamated Association; 134 votes for the Huntington Steel Workers Association; 7 votes for other persons or organizations; 25 votes invalid. The result of the election establishes the Amalgamated association as the representative for the workers in dealing with the management. The election had been requested by the National Steel Labor Relations Board after the Amalgamated association had claimed that the company had refused to deal with it, despite a majority union membership among employees at the plant. The election board was comprised of conciliator Dewey, two Amalgamated representatives, two company union representatives, and two neutral workmen. As a result of the election, the Amalgamated association will represent the rail company workers for one year.

TRADE NOTES

Allegheny Equipment Corpn., 1218 Grant Building, Pittsburgh, with warehouse at Bradford, Pa., has been made authorized distributor for Link-Belt crawler shovels, cranes, draglines and locomotive cranes.

Durant Mfg. Co., Milwaukee, maker of counting and measuring devices, has opened eastern division office and warehouse at 181 Eddy Street, Providence, R. I., where complete stock of Productimeters will be carried.

Poole Foundry & Machine Co., Baltimore, has acquired all domestic and foreign patents of Poole Engineering & Machine Co., including all-metal gear and lubricated flexible couplings.

George P. Thomas Sees Diminishing Russian Market

(Concluded from Page 25)

A structural mill is under construction, plate mill and other finishing mills will be installed later.

This mill has one of the finest and best equipped laboratories where all facilities are provided for the requirements of a modern mill, and where all kinds of analyses—fire clay, coal, etc., are made.

The mills must bring part of their raw materials long distances,—as much as 1000 miles or more, over single track railroads equipped with light rails, not over 60 or 65 pounds, and the speed seldom exceeds 25 miles per hour.

The management and personnel of these various industries are very enthusiastic and self-confident. One very young manager cheerfully told us that while they had equipped their mills entirely with foreign equipment and copied our latest practice, from there on they proposed to strike out for themselves and leave us behind. "Just as opening the flood gates of opportunity to every man in the United States pushed Americans to the front, so Russia, giving opportunities to every young man and young woman, ultimately will put them in the lead."

Side lights in mill management would give fits to some of our American managers. Sex does not exist in the operation of mills and other plants in Russia. Side by side, women work on the charging floors of the open-hearth and blast furnaces. In the yards and everywhere—carrying bricks or relining a furnace—both sexes are seen working side by side. Barefooted children are seen strolling about outside in the yards and in the buildings, watching, with wonder, the metal flowing into the big ladles from the blast furnace or the open hearth; or watching the blooming mill rolling fat ingots into long, candy-like sticks.

One thing that strikes the American in all these industries, and causes keen disappointment, is the absence of American equipment everywhere.

One director was very emphatic about this. "They asked, they wanted, American machinery," he said, "it was better, it was stronger, it filled their exact requirements, maintenance was less," but they could not get it on account of credit and, with a little touch of malice, he added, "You fellows bet on the wrong horse. The Germans borrowed the cash from you to finance the equipment they sold us. They are getting their money, but will you get yours?"

These plants were designed by Freyn of Chicago, McKee of Cleveland, Kahn of Detroit, Austin of Cleveland, and other American companies, but in all these plants only a small sprinkling of American machinery is found.

For future business, Russian policy will be "Buy only the very minimum possible outside." With the Sverdlovsk plant, they can build and maintain rolling mill equipment and blast furnaces to meet most of their needs.

Plainly, Russia is going forward but progress will necessarily be slow, and much of the old Russia that was good was destroyed in the fervor of the revolution and must be replaced.

Her railroads are seemingly well managed but plainly inadequate, and add to this the almost total absence of roads and you have one of her major problems.

In their enthusiasm they have started too many projects especially in the building field, and the shortage of experienced technical men and skilled hands is most severe.

Then again their system chills initiative through the fear of making mistakes, which is serious for a Russian, and constructive criticism is timid as it may be misinterpreted.

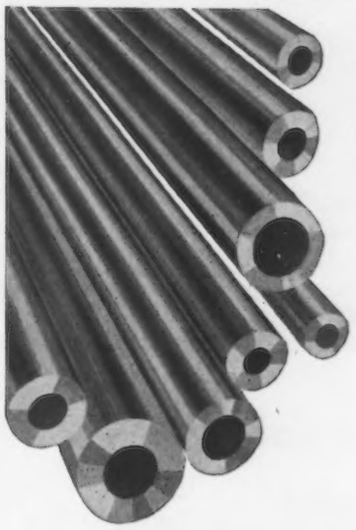
Ultimately to be on a sound footing and become really prosperous Russia must heed economic laws.

Whatever political system a nation may adopt, these laws remain the same. Her enterprises large and small must become self-sustaining. Then, and only then, can she valorize her ruble. This she must face sooner or later if its purchasing power is to become fixed even within her own borders. Can she accomplish this under a national monopoly controlling all material wealth and human activities? Only time can tell. In the larger enterprises, it is possible. In the field of the small industries both manufacturing and merchandising this appears very doubtful.

But Russia has the resources and she has the men and apparently is prepared to scrap ideas as well as men who may stand in the way.

Very truly yours,

GEO. P. THOMAS, *President,*
Thomas Spacing Machine Co.,
Pittsburgh.



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Cincinnati Philadelphia

Trackwork Shipments Higher in August

SHIPMENTS of trackwork for tee rail track of 60 lb. per yd. and heavier during August amounted to 5364 net tons, according to the American Iron and Steel Institute. This was a slight increase over the 5226 tons shipped during July and compares with shipments of 3425 tons in August, 1933.

Railroad Equipment

Pennsylvania Railroad is inquiring for 10, 25, 30 or 50 electric locomotives.

Chilean State Railways are likely to enter the market for 10 4-8-4 type locomotives.

PLANT EXPANSION AND EQUIPMENT BUYING

Hope for Fall Improvement In Machine Tool Demand

SUMMER dullness still continues with respect to machine tool demand. Aside from re-tooling of some automotive departments there seems to be no urge upon manufacturers to take immediate advantage of the economies offered by the many improved machines now available.

Fall improvement is hoped for, more on the grounds of natural seasonal tendency than on the basis of optimism concerning the general outlook.

The Cincinnati market is without interesting features this week. Some shops are building a fair amount of stock in anticipation of the seasonal expectations. In Cleveland this week the Warner & Swasey Co. secured an order for seven large turret lathes from an eastern steel maker. Local dealers are still very quiet. The Chicago market reports no unusual features.

NORTH ATLANTIC

Vulcan Rail & Construction Co., Grand and Morrison Avenues, Maspeth, L. I., manufacturer of ornamental and other iron products, has filed plans for two-story addition, 24 x 110 ft., for pipe-fitting and kindred service, storage and distribution. J. R. O'Donnell is company architect.

Municipal Department of Docks, Pier A, North River, New York, has authorized construction of new two-story steel shed on Pier 32, 125 x 1020 ft. Cost $1,030,000 with mechanical-handling and other equipment. Fund in amount noted has been secured through Federal aid.

Schenley Distillers Corpn., 20 West Fortieth Street, New York, has let general contract to Albert J. Lubrecht, Covington, Ky., for new multi-story storage and distributing building and other units, including cooperage shop at James E. Pepper Distillery, Lexington, Ky., a subsidiary, to replace part of plant destroyed by fire last April. Cost over $300,000 with equipment. Other units will be built later to cost still larger sum. Carl J. Kiefer, Schmidt Building, Cincinnati, is consulting engineer.

State Department of Public Works, State Office Building, Albany, N. Y., has filed plans for new mechanical works at Jamaica, L. I., including one-story workshop, equipment storage and distribution unit, automobile service and garage building, pumping plant and other structures. Cost about $260,000 with equipment.

Signal Supply Officer, Army Base, Brooklyn, asks bids until Sept. 19 for cables and four reels (Circular 19); until Sept. 28, 170 dynamotors (Circular 18).

Fletcher Machinery Corpn., New York, has been organized by Joseph Montgomery, 571 Dewey Avenue, Grantwood, N. J., and George H. Halbert, 395 West New Brighton, S. I., to manufacture machinery and parts.

National Sugar Refining Co., 129 Front Street, New York, will soon begin superstructure for new one-story storage and distributing building, 100 x 120 ft., at Long Island City, in conjunction with refinery at that place. N. A. Andrews, National Refinery, Yonkers, N. Y., is company architect.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 18 for magnet wire (Schedule 3293) for Brooklyn Navy Yard; seven motor-driven bench grinders and spare parts (Schedule 3275), seven motor-driven engine lathes and spare parts (Schedule 3273), seven motor-driven drill presses and spare parts (Schedule 3274) for Brooklyn, Philadelphia and Charleston yards; four turbo-generator sets, four voltage regulators, and two generator and distribution switchboards and spare parts (Schedule 3218) for Brooklyn and Charleston yards; until Sept. 21, oil-burning signal lights, oil-burning running lights, oil-burning deck lanterns, oil-burning hand lanterns, etc. (Schedule 3281) for Brooklyn yard.

Schroon River Pulp & Paper Co., Warrensburg, N. Y., will make improvements in mill, including new equipment. Plant has been idle for past three years.

Airite Corpn., Herkimer, N. Y., has been organized by David H. Ames, Jr., 402 French Road, Utica, N. Y., and Angus M. Waterbury, Whitesboro, N. Y., to manufacture air-conditioning equipment, cooling appliances, etc.

Department of Water Supply, Gas and Electricity, Richmond, Staten Island, New York, plans installation of pumping machinery and accessory equipment, pipe lines, etc., for extensions and improvements in municipal water system. Fund of $1,523,000 has been arranged through Federal aid.

American Agricultural Chemical Co., 420 Lexington Avenue, New York, manufacturer of commercial fertilizers, etc., will soon begin superstructure for initial units of new plant at South Amboy, N. J.; electric furnaces and accessory equipment will be installed in main manufacturing division. All other machinery will be electric-operated. Cost about $300,000 with equipment. Dr. R. L. Sebastian is chief chemical engineer in charge.

Wiener Body Co., Inc., Newark, N. J., has been organized by Max L. Wiener and associates, to manufacture automobile bodies and operate a body repair works. Company will take over company of same name at 245 Raymond Boulevard.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 18 for 15 seamless steel cylinders for carbon dioxide (Schedule 3282) for Philadelphia and New York Navy Yards; until Sept. 21, 800 airspeed indicators (Schedule 3306) for Philadelphia yard.

Lebanon Valley Distilling Co., Reading, Pa., care of W. J. Cavanaugh, Drexel Hill, Pa., recently organized, has taken over former plant of Bomberger Distilling Co., near Schaefferstown, Pa., inactive for several years, and will remodel for new plant. Cost over $40,000 with machinery.

Krebs Pigment & Color Corpn., 256 Vanderpool Street, Newark, a subsidiary of E. I. duPont de Nemours & Co., Inc., Wilmington, Del., has acquired 96 acres at Edge Moor, Del., fronting on Delaware River, as site for new plant, to include power house, machine shop and other mechanical departments. It is scheduled for completion in about nine months. Cost over $400,000 with equipment.

BUFFALO DISTRICT

Commissioner of Correction, State Office Building, Albany, N. Y., asks bids until Sept. 20 for power house at Elmira Reformatory, Elmira, N. Y., including electrical and other apparatus, coal-handling equipment, etc. Commissioner of Architecture, first noted address, is architect.

Common Council, Angola, N. Y., plans extensions and improvements in water system, including installation of pumping machinery and accessories, pipe lines, etc. Federal fund of $50,000 has been arranged. William S. Lozier, Inc., 10 Gibbs Street, Rochester, N. Y., is consulting engineer.

Samson-United Corpn., Probert Street, Rochester, N. Y., manufacturer of electric household appliances and devices, will soon begin production in new branch plant at 75 Sherbourne Street, Toronto, where space has been leased. Company has recently organized Samson-United of Canada, Ltd., to operate new works.

Alberta Carbon Coal Co., Ltd., Edmonton, Alta., Herbert Cameron, secretary and treasurer, plans installation of tipple machinery, elevating and conveying and other equipment, at coal-mining properties. Company is arranging financing to total $250,000, considerable portion of fund to be used for purpose noted. S. J. Bartlett, 1500 Walnut Street, Philadelphia, represents company in United States.

NEW ENGLAND

International Paper Co., Turners Falls, Mass., will make improvements in mill, closed for several months preparatory to resumption in operation, including installation of new equipment and repairs to present machinery. Headquarters are at 220 East Forty-second Street, New York.

West & Dodge Thread Gauge Co., Inc., Boston, has been organized by Donald A. Cameron and Herbert A. Flint, 171 Camden Street, to manufacture thread gages and other textile mill equipment.

Johnson-Lindahl Co., Inc., Hartford, Conn., recently organized, is opening sheet metal works at 99 Franklin Street, formerly occupied by Lindahl, Inc., for production of roofing and kindred metal products. John O. Johnson, formerly connected with Johnson Sheet Metal & Roofing Co., Norwich, Conn., heads new company.

School Board, Andover, Mass., plans manual training department in new multi-story high school, for which bids will soon be asked on general contract. Cost about $400,000. Finance-

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THE NEWPORT ROLLING MILL CO., NEWPORT, KY.

ing has been arranged. Perley F. Gilbert, Central Block, Lowell, Mass., is architect; Kilham, Hopkins & Greeley, 126 Newbury Street, Boston, are consulting architects.

Colonial Beacon Oil Co., 30 Beacham Street, Everett, Boston, will soon begin work on new bulk oil storage and distribution plant at Newburyport, Mass., for which general contract recently was let to H. V. Collins, 4 Westminster Street, Providence, R. I. Cost over $40,000 with tanks and other equipment.

OHIO AND INDIANA

Youngstown Steel Door Co., Youngstown, Ohio, has approved plans for one-story addition for expansion in steel fabricating division. Part of unit will be used for storage and distribution. Cost about $70,000 with equipment. H. H. Hendricks is vice-president.

City Council, Coshocton, Ohio, plans installation of new steam-electric generating plant, pumping machinery and accessories, pipe lines, etc., for extensions and improvements in municipal waterworks. Fund of $164,000 has been arranged through Federal aid.

Green's Heat Control, Inc., Cleveland, has been organized by S. M. Green, care of Carl M. Babst, 582 Arcade Building, representative, and associates, to manufacture heating control equipment and devices.

Material Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until Sept. 17 for one carbureter metering jet flow-meter assembly (Circular 97); until Sept. 18, solvent-resisting hose (Circular 101); until Sept. 24, inspection opening plates, inspection opening rings, opening plate assemblies, oil tank to drain cock line, brackets, plates, etc. (Circular 100), one forging die (Circular 98); until Sept. 25, one mooring mast (Circular 91); until Sept. 27, altimeters (Circular 94).

Columbia Metal Stamping Co., 11900 Harvard Boulevard, Cleveland, has leased building on East 116th Street for new plant and will expand present capacity.

Waco Aircraft Co., Troy, Ohio, manufacturer of airplanes and parts, has plans for new branch plant at Fort Erie, Ont., primarily for assembling operations.

State Hospital Department, Indianapolis, is planning extensions and improvements in power house at institution at Logansport, Ind., including new equipment. Cost about $100,000 with machinery. Appropriation will be arranged soon.

Knapp Electric, Inc., 3029 East Washington Street, Indianapolis, has been organized by Martin Greenberger and Leonard A. Sussman, to manufacture electric toys and equipment.

SOUTH ATLANTIC

City Council, Cornelia, Ga., asks bids until Sept. 17 for 200,000-gal. steel standpipe, pumping machinery and accessories, filtration machinery, pipe lines, etc., for municipal waterworks. Fund of $90,000 has been arranged through Federal aid. Robert & Co., Inc., Bona Allen Building, Atlanta, Ga., is consulting engineer.

Peninsular Refining Corpn., Tampa, Fla., L. H. McIntire, Tampa, president, organized a few months ago, has plans for new oil refinery. Cost over $300,000 with machinery. Company is arranging financing totaling about $335,000 for project. H. E. Nott, Tampa, is secretary and treasurer.

United States Engineer Office, Jacksonville, Fla., asks bids until Oct. 1 for combined hurricane gate and navigation lock structure on Lake Okeechobee, near Moore Haven, Fla., complete with operating machinery, electric power and lighting installation, equipment storage and distribution building and other structures and equipment.

Common Council, Louisville, Ga., plans installation of pumping machinery, pipe lines, etc., for extensions in municipal water system. Federal fund of $24,000 has been secured.

WESTERN PENNA.

Westinghouse Electric & Mfg. Co., East Pittsburgh, has authorized expansion program at electric refrigerator plant, Mansfield, Ohio, including new factory unit and installation of equipment. Cost about $175,000 with machinery.

National Brass & Copper Co., Inc., Pittsburgh, recently organized by local interests, has taken over plant and property of company of same name at Lisbon, Ohio, including 13-acre tract, and will establish headquarters and operate at that location.

Board of Sewerage Commissioners, Wheeling, W. Va., plans sewage disposal plant and system, with installation of sludge machinery and auxiliaries, pumping and other mechanical equipment. Fund of $987,000 is being secured through Federal aid.

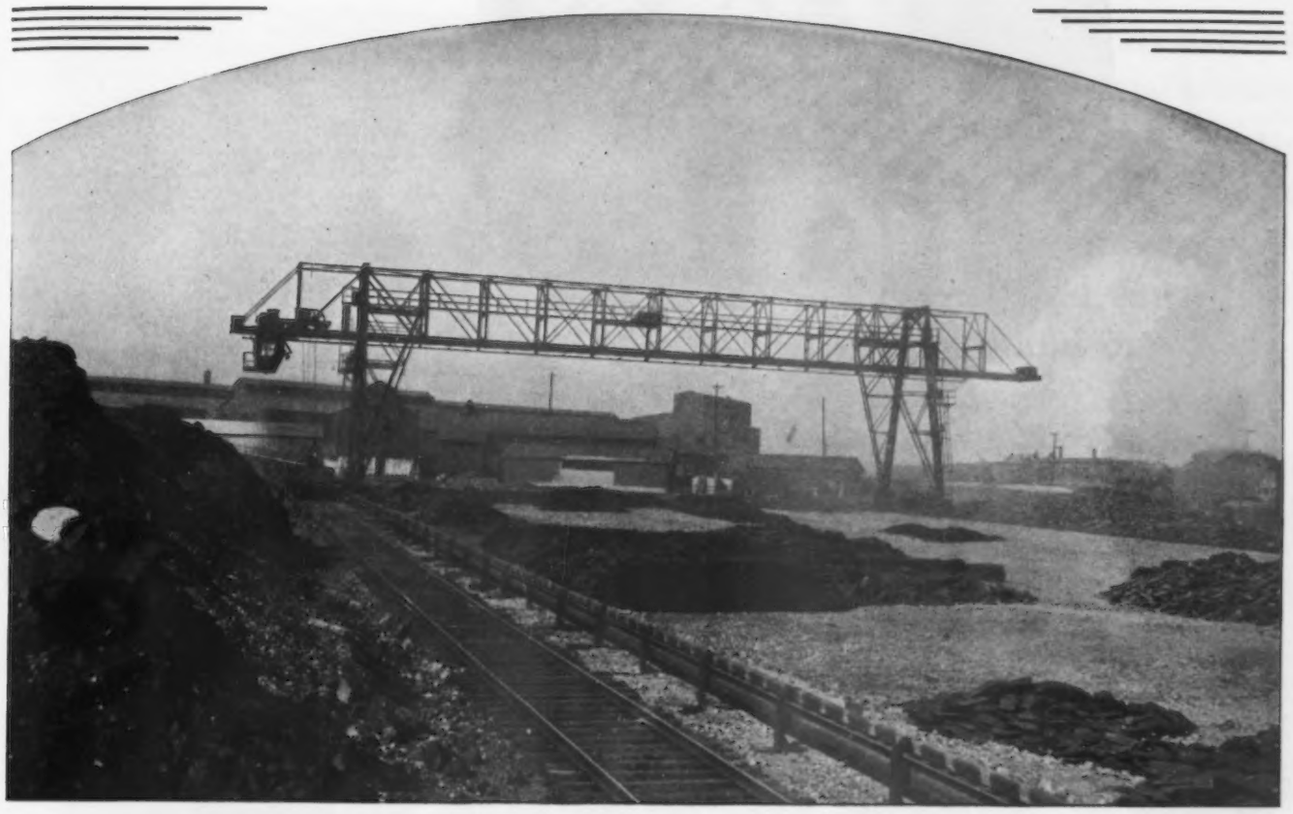
SOUTHWEST

White Eagle Oil Co., Federal Reserve Bank Building, Kansas City, Mo., has plans for new bulk oil storage and distribution plant. Cost about $65,000 with steel tanks and other equipment.

United States Engineer Office, Missouri River Division, Kansas City, Mo., asks bids until Sept. 21 for 43 garage and service buildings at Fort Peck, Mont., construction camp (Circular 101).

Board of Education, Duncan, Okla., is considering manual training department in new high school and junior college. It is proposed to arrange fund of $175,000 for project. J. B. White, Ardmore, Okla., is architect.

City Council, Normangee, Tex., asks bids until Sept. 18 for equipment for municipal waterworks, including elevated steel tank and tower, 50,000-gal. capacity; pumping machinery and accessories, pipe lines, etc. Fund of



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$32,000 has been arranged. Culpeper & Flagg, Rusk Building, are consulting engineers.

Baash-Ross Tool Co., 5512 Boyle Avenue, Los Angeles, manufacturer of oil well tools and equipment, is planning new branch plant at Houston, Tex., where property will be leased.

Todd Shipyard Corpn., New Orleans, with branch plant at Mobile, Ala., has taken over shipyard of Galveston Drydock & Construction Co., Galveston, Tex., and will remodel for new branch shipbuilding and repair plant, including construction of new 10,000-ton drydock and operating facilities, shops, etc.

City Council, Burlington, Kan., is considering new municipal electric light and power plant. Cost about $145,000 with equipment. E. T. Archer & Co., New England Building, Kansas City, Mo., are consulting engineers.

Common Council, Thornton, Tex., plans installation of pumping machinery and accessory equipment, pipe lines, etc., for municipal water system. Fund of $59,000 has been secured through Federal aid.

SOUTH CENTRAL

Cummins Distillery Corpn., Louisville, care of Walter C. Wagner, Breslin Building, Louisville, architect, will soon take bids for boilers, stokers, copper kettles, copper piping and other equipment for expansion and improvements in distillery at Athertonville, Ky. General building contract has been let to H. G. Whittenberg, Louisville. Cost about $200,000 with machinery.

Director of Purchases, Tennessee Valley Authority, New Sprankle Building, Knoxville, Tenn., asks bids until Sept. 20 for seat frames and bronze liners, complete with anchor rods, etc., for 24 turbine draft tube bulkhead gates for Wheeler power plant; until Sept. 24, pole line and distribution hardware, insulators, etc., for power transmission line.

Town Council, Warrior, Ala., plans installation of pumping machinery and accessory equipment, pipe lines, etc., for municipal water system. Federal fund of $38,000 has been secured.

United States Engineer Office, Memphis, Tenn., asks bids until Sept. 17 for one portable torsion meter and accessories (Circular 85).

Wathen Distillery Co., Lebanon, Ky., plans new one-story bottling works and storage and distributing plant at Louisville. Cost close to $45,000 with equipment. John A. Wathen is general manager.

MICHIGAN DISTRICT

McClanahan Oil Co., Mount Pleasant, Mich., Walter L. McClanahan, president, plans new oil refinery at Wheeler, Mich., near company oil wells. Cost over $175,000 with equipment. Storage and distribution facilities will be provided.

Kellogg Co., Battle Creek, Mich., manufacturer of cereal products, has approved plans for new grain elevator, with storage capacity of 1,000,000 bu. Cost over $200,000 with elevating, conveying and other equipment.

Upton Machine Co., St. Joseph, Mich., has plans for one-story addition for storage and distribution. Cost about $40,000 with equipment.

Bell Mfg. Co., 9215 Savery Street, Detroit, has been organized by Jerome L. Gottfried, 3353 Boston Boulevard, and associates, to manufacture automobile parts and other mechanical equipment.

Motor Products Corpn., 11801 Mack Avenue, Detroit, manufacturer of automotive equipment, has let general contract to A. A. Albrecht Co., Penobscot Building, for one and two-story addition, 60 x 200 ft., for storage and distribution. Cost about $50,000 with equipment. Smith, Hinchman & Grylls, Marquette Building, are architects and engineers.

WASHINGTON DISTRICT

Board of District Commissioners, District Building, Washington, asks bids until Oct. 18 for cast iron lamp post parts, including 75 bases one type, 80 bases another type, 164 shafts, 75 casings.

Bureau of Yards and Docks, Navy Department, Washington, has let general contract to Hughes-Foulkrod Co., Schaff Building, Philadelphia, for one-story addition to building No. 163, Navy Yard, Norfolk, Va., at $609,500 exclusive of equipment. Bureau will receive bids Sept. 19 for two portable return-flue fire box boilers with accessories, guyed steel stack, smoke breeching, etc., for power house at Marine Barracks, Flying Field, Quantico, Va. (Specification 7780).

Crown Cork & Seal Co., 4101-25 Eastern Avenue, Baltimore, will soon take bids on general contract for one-story addition, 80 x 400 ft., for storage and distribution. Cost over $40,000 with equipment. Lucius R. White, Jr., 10 West Chase Street, is architect.

General Purchasing Officer, Panama Canal, Washington, asks bids until Sept. 20 for two track-drilling machines, 10 switch stands, 500 water buckets, 144 tubular hand lanterns, hasps and staples, escutcheon pins, etc. (Schedule 2994); until Sept. 27, 20,000 ft. tinned copper wire, 22,600 ft. rubber insulating cable, fire extinguishers, lawn sprinklers, 6000 ft. coil chain, pipe fittings, etc. (Schedule 2996).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 18 for one motor-driven radial drill (Schedule 3294) for Washington Navy Yard.

MIDDLE WEST

Acme Steel Co., 2840 South Archer Avenue, Chicago, manufacturer of steel bands, strips, box strapping, etc., has asked bids on general contract for two-story addition to plant at Riverdale, Ill., 90 x 575 ft. Cost over $200,000 with equipment.

North Shore Spring & Wheel Co., 6240 Broadway, Chicago, manufacturer of automobile wheels, springs and kindred products, has let general contract to Pere Anderson, 5763 North Richmond Street, for one-story addition, 39 x 50 ft. Cost about $24,000 with

Photograph taken in plant of The Lamson Co., Inc., Syracuse, N.Y. Manufacturers of Conveyors. Armstrong-Blum No. 8 Marvel Machine, 18½" diameter wheels, 30 R. P. M., operating with Disston Band Saw, 14 feet long, ¾" wide, 13 teeth per inch, cutting channels, angles and other work requiring band saws that stand up well. "Disston Band Saws entirely satisfactory," is statement for The Lamson Co., authorized by D. H. Overhiser, Purchasing Department.

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equipment. Frederick Stanton, 307 North Michigan Avenue, is architect.

Superior Foundry Co., Columbia and Herschel Streets, East Peoria, Ill., has been organized by Charles Bucklar, East Peoria, and associates, to manufacture iron and other metal castings.

Milwaukee Road, Union Station, Chicago, plans addition to engine house and repair shop at Minneapolis, Minn. Cost about $25,000 with equipment.

Common Council, Rifle, Colo., plans new municipal electric light and power plant. Cost about $70,000 with equipment. Bond issue is being arranged. E. Harrison Thwaits, 357 Lafayette Street, Denver, is consulting engineer.

Platte Valley Public Power and Irrigation District, North Platte, Neb., care of Donald D. Price, North Platte, chief engineer and general manager, has plans for hydroelectric generating plant on North Platte River, near Keystone, Neb., with transmission lines, in connection with irrigation project. Fund of $7,500,000 has been arranged through Federal aid. Parsons, Klapp, Brinckerhoff & Douglas, 142 Maiden Lane, New York, are consulting engineers.

Tankar Gas, Inc., Foshay Tower Building, Minneapolis, Minn., Karl T. Wiedeman, president, has plans for new bulk oil storage and distribution plant, including one 200,000-gal. capacity steel tank, one 100,000-gal., and several smaller tanks, pumping and other machinery. Cost close to $50,000 with equipment. Liebenberg & Kaplan, McKnight Building, are architects.

Joseph Weidenhoff, 4352 West Roosevelt Road, Chicago, manufacturer of electrical equipment, parts, etc., has let general contract to E. J. Biggs Construction Co., 1717 West Eighty-third Street, for one and two-story addition. Cost over $25,000 with equipment. Frank Huddleston, 140 South Dearborn Street, is engineer.

City Council, Stoughton, Wis., closes bids Sept. 14 for three Diesel type generating units, capacity 800 to 900 kw., for extension of municipal power plant. W. G. Kirchhoffer, 22 North Carroll Street, Madison, Wis., is consulting engineer. E. U. Norman is city clerk.

County Board, Eau Claire, Wis., is considering bids for one-story addition, 50 x 127 ft., to County highway department machine, service and storage unit. Cost about $30,000 with equipment.

City Manager, Kenosha, Wis., closes bids Sept. 14 for $100,000 waterworks improvement project, including new steel standpipe, pump house, booster pump and quantity of cast iron pipe. Alvord, Burdick & Howson, 20 North Wacker Drive, Chicago, are consulting engineers.

◀ PACIFIC COAST ▶

Water Department, Santa Barbara, Cal., plans one-story repair shop and garage unit for equipment and trucks. Cost about $25,000. Work will be carried out in connection with waterworks expansion program, including new filtration plant, pumping and other mechanical equipment, pipe lines, etc. Special election will be held in October to vote bonds for $390,000 for project.

Sperry Flour Co., Fourth and Berry Streets, San Francisco, plans rebuilding part of marine grain elevator and plant at South Vallejo, Cal., recently destroyed by fire. Loss about $200,000 with equipment.

Board of Education, Long Beach, Cal., will take bids at once for David Starr Jordan high school, including one-story vocational training shops. Cost about $200,000. Martin C. Parker, 1071 East Broadway, is architect.

Fallbrook Citrus Association, Beech Street, Fallbrook, Cal., has let general contract to Kingston-Bean & Co., Fallbrook, for one-story addition to packing plant, about 18,000 sq. ft. floor space. Cost about $35,000 with conveying, packing and other equipment.

Visalia Baking Co., North Court Street and N. W. Second Avenue, Visalia, Cal., J. A. Sutten, head, plans rebuilding plant recently destroyed by fire. Loss over $150,000 with ovens, mechanical-handling and other equipment.

Santa Rosa Meat Packing Co., College Avenue, Santa Rosa, Cal., has let general contract to Hume Bunyan, 724 Washington Street, for extensions and improvements. New equipment will be installed. Cost about $35,000 with machinery. J. B. Humphrey is president.

Bakersfield Brewery, 1660 Chester Avenue, Bakersfield, Cal., C. Fred Baker, secretary, in charge, has plans for new brewery, work to begin this month. Cost about $90,000 with equipment.

◀ FOREIGN ▶

Municipal Council, Oslo, Norway, has acquired tract of about 1,000,000 sq. meters, near city, for new combined airport and seaplane base, consisting of hangars, repair shops, oil storage and distribution buildings, and other field structures. Work will begin soon. Cost over $3,000,000 with equipment.

Commissariat of Electric Power, Soviet Russian Government, Moscow, plans hydroelectric generating plant at Levshino, in connection with large lumber plant in same district. Cost over $7,000,000 with machinery. Amtorg Trading Corpn., 261 Fifth Avenue, New York, is official buying agency.

Ministry of Industries, Istanbul, Turkey, has approved plans for new paper mill at Izmid, Turkey, with power house, machine shop and other mechanical departments. Cost over $1,500,000 with machinery. Plans have also been approved for a new glass bottle and container plant at Pacha Bagtche, in the Bosporus. Cost over $750,000 with equipment.

Baldwin Locomotive Works, Philadelphia, on Sept. 17, will assume all sales and engineering of the products of its subsidiary, Whitcomb Locomotive Co., Rochelle, Ill., and will establish an internal combustion locomotive section of its sales department, in charge of H. H. Perry as manager, assisted by H. V. Huleguard. Mr. Perry is now vice-president and general manager, and Mr. Huleguard, sales manager of the Whitcomb company. The new section will handle all sales of Baldwin and Whitcomb internal combustion locomotives of all sizes, and sales of electric locomotives except to public service railroads.

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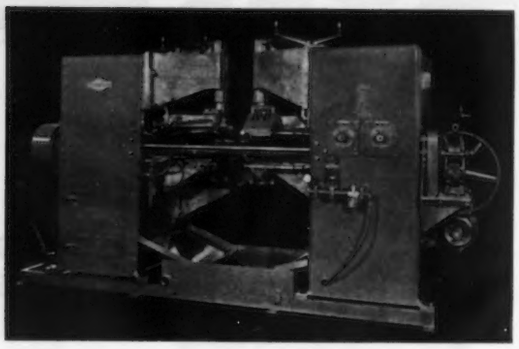

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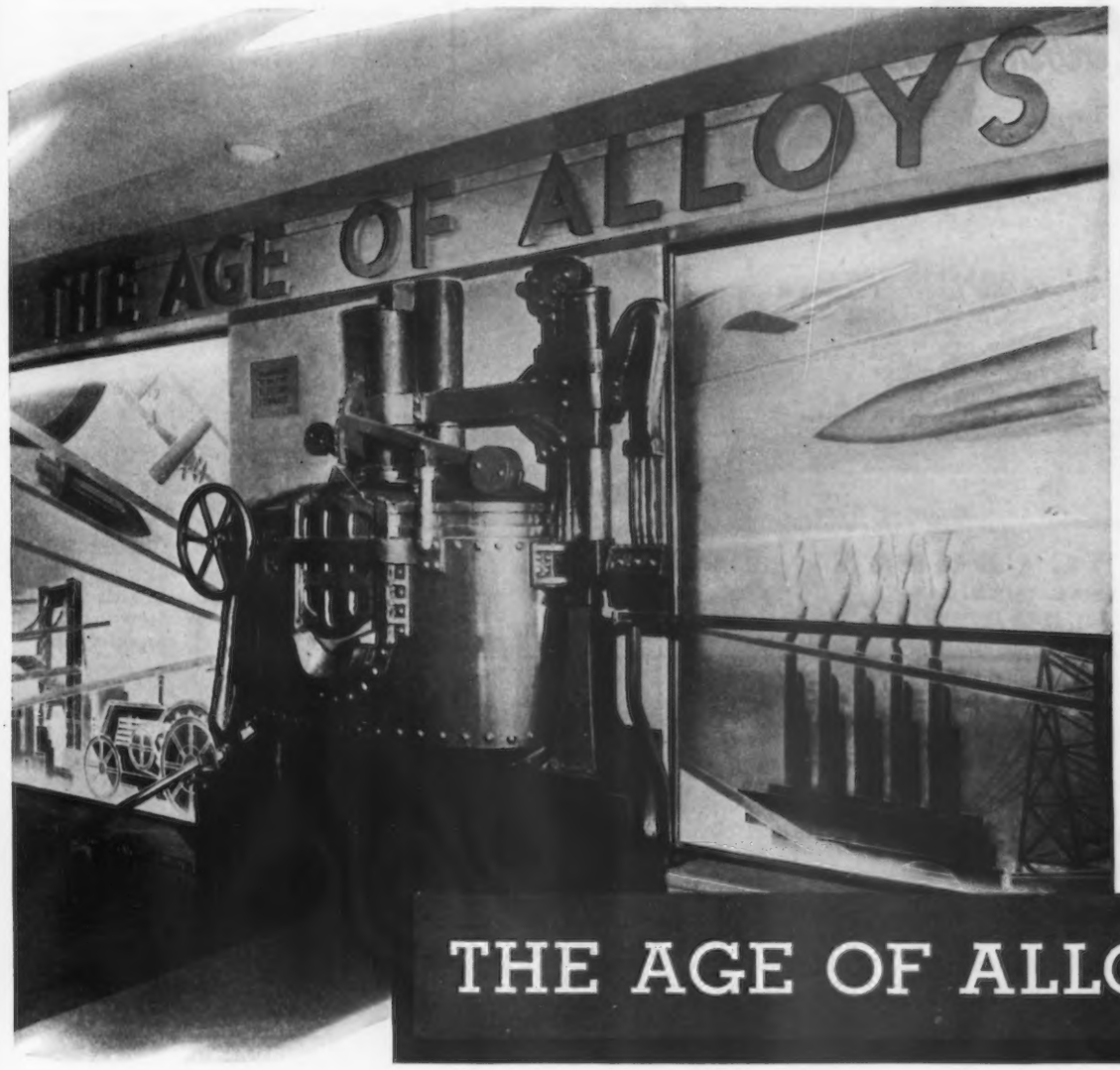
Desired production per hour .....

6142



THE AGE OF ALLOYS

THE age of alloys is symbolized by the electric furnace, used in their production. Beauty, speed, lightness, strength and durability are descriptive of modern equipment fabricated of metal alloys. All transportation—rail and highway—water and air—is being made swifter and safer by their extra strength and lightness, machinery is stronger and more durable, and even our homes are more beautiful and livable because of these alloys.

Alloys in steel provide increased tensile strength and greater resistance to abrasion, impact, distortion, corrosion and fatigue. When designing or ordering new equipment remember that there is an alloy steel for every problem of strength and durability. Electromet engineers with the experience of years of research, are glad to give you all the information you desire on the use of alloys and alloy steels.

ELECTRO METALLURGICAL COMPANY
Unit of Union Carbide and Carbon Corporation

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Lower Production Costs
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Designed and built to handle steel or wood kegs, drums or barrels of all k nds. Strong frame of 1¼" angle iron. 45" high, 14" wide. Hyatt Bearings. Rubbered wheels, if desired.
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Popular all-steel truck for handling barrels, boxes, etc. 45" high, 20" wide. Hyatt Bearings. Heavy rubbered tires.
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Canadian Imports of Pipes, Tubes and Fittings During 1933

RECEIPTS of pipe, tubes and fittings by Canada during 1933 have been classified as follows, and amounts imported, together with chief countries of supply, are indicated: Pipe, tubes and flues of wrought iron or steel, with plain, swelled or thickened ends, for use exclusively in the manufacture or repair of pressure parts of boilers, pulp mill digesters and vessels for the refining of oil, 271,337 net tons and supplied by the United Kingdom (129,157 tons), United States (108,848 tons), and Germany (33,332 tons); pipe and tubes, wrought iron or steel, plain or coated, not joined, with plain ends, not more than 2½ in. in diameter, 13,928 tons, chiefly supplied by the United Kingdom (10,970 tons), and the United States (2942 tons); pipe and tubes of steel, seamless, cold drawn, plain ends, valued at not less than 5c. per pound, n.o.p., 166,124 tons, furnished chiefly by the United States (110,720 tons), and the United Kingdom (53,351 tons); pipe and tubes, wrought iron or steel, plain or coated, welded or seamless, with plain or processed ends, more than 10½ in. in diameter, n.o.p., 25,084 tons, received principally from the United Kingdom (14,644 tons), and the United States (9347 tons); pipe and tubes of wrought iron or steel, plain or coated, welded or seamless, with plain or processed ends, not more than 10½ inches in diameter, n.o.p., 128,143 tons, chiefly purchased from the United Kingdom (63,860 tons), the United States (63,001 tons), and Germany (1282 tons); pipe and tubes, not exceeding two inches in diameter, made from puddled iron, when for use exclusively in recovering crude petroleum, 283 tons, all supplied by the United Kingdom; and pipes and tubes, wrought iron or steel, plain or coated, n.o.p., 22,690 tons, supplied by the United States (17,589 tons), and the United Kingdom (5012 tons).

Canadian exports of pipe and pipe tubing of iron and steel during 1933 totaled 683,839 tons, and were shipped chiefly to the United States (288,128 tons), Australia (97,140 tons), New Zealand (70,451 tons), British South Africa (55,605 tons), Argentina (47,685 tons), Brazil (13,857 tons), and Denmark (24,351 tons). Exports of pipe fittings of iron and steel during this same year amounted to 50,074 tons, the chief countries of purchase being the United Kingdom (19,369 tons), New Zealand (6452 tons), Newfoundland (3419 tons), and Jamaica (1336 tons), the United States taking 607 tons.

Detroit Steel Club Holds Golf Outing

A LARGE number of steel buyers, mill executives and district sales managers of steel companies participated in the second annual golf tournament and dinner of the Iron and Steel Club of Detroit at the Indianwood Golf Club, near Pontiac, Mich., on Saturday, Sept. 8. The president's cup for low score was won by Arthur Schaeffer, district manager, Republic Steel Corpn. Golf prizes were presented to the winners by James Schermerhorn, well-known Detroit humorist, who was toastmaster at the dinner. The program was in charge of H. N. Arbuthnot, Allegheny Steel Co., secretary of the club. Other club officers are C. A. Poxson, Newton Steel Co., president; W. J. Clucas, Rotary Electric Steel Co., vice-president; and directors; A. J. Bopp, Bopp Steel Corpn.; E. M. Vehmeyer, Joseph T. Ryerson & Sons, Inc.; A. A. Keally, Sharon Steel Hoop Co.; and Earl Park, Superior Steel Corpn.

Among the mill executives present were E. D. Graff, first vice-president, Joseph T. Ryerson & Sons, Inc.; W. J. McArdle and W. A. Givens, general sales manager and general superintendent, respectively, of Allegheny Steel Co.; L. N. Douglass, sales manager, Greer Steel So.; A. M. Jones, assistant sales manager, Buffalo Bolt Co.; A. M. LeTellier, vice-president, Cuyahoga Steel & Wire Co.; T. Lloyd Kelly and R. J. Schuler, vice-president and sales manager respectively of LaSalle Steel Co.; William P. Ewing, manager of sales, Superior Steel Corpn.; M. W. Leech and L. W. Briggs, vice-president and sales manager respectively of West Leechburg Steel Co.; A. F. Dohn, vice-president, Ludlum Steel Co.; Frank Childs, assistant sales manager, Corrigan-McKinney Steel Co.; F. H. Loomis, assistant director of sales in charge of strips and sheets, Republic Steel Corpn.; W. F. Vosmer, assistant director of sales in charge of bars and semi-finished steel, Republic Steel Corpn.; and C. M. White, assistant general manager in charge of operations, Republic Steel Corpn.

Armco Broadcasts To Be Resumed

BEGINNING Sunday, Sept. 30, at 6:30 a. m. Eastern standard time, the famous Armco Band and the familiar voice of the Armco Ironmaster will again be heard over NBC's Red Network and Southwestern stations. Twenty-one stations will broadcast these programs, each Sunday night.

The Armco Ironmaster will present his brief but interesting talks on the part the iron and steel industry is playing in world progress. Bennett Chapple, who takes the part of the Ironmaster, is vice-president and director of publicity for The American Rolling Mill Co.

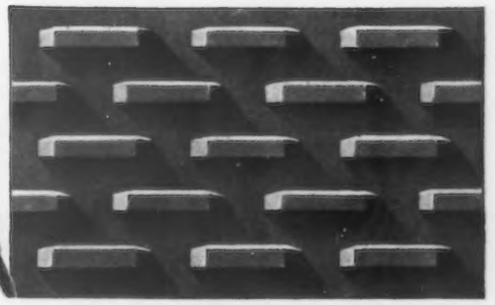
Armco will be joined this year by its subsidiary, Sheffield Steel Corpn., in sponsoring these programs. Sheffield will make special commercial announcements over the Southwestern group, which covers the territory it serves. The Armco commercials will go out over the Red Network.

FOOTHOLD
"makes the grade"

Where the foot can be planted firmly, the man can move with confidence. Where footing is uncertain, grave hazards may result. Let your workers walk in safety. Install Carnegie Floor Plate. On elevated platforms, foot bridges, shop and boiler room floors, stair treads, sidewalk doors and openings, and the like, the non-slip, easy-draining, raised pattern surface of this modern material makes walking comfortable and labor efficient. It reduces the chance of accident, at little cost. A considerable range of widths and thicknesses are offered. Full information mailed upon request.

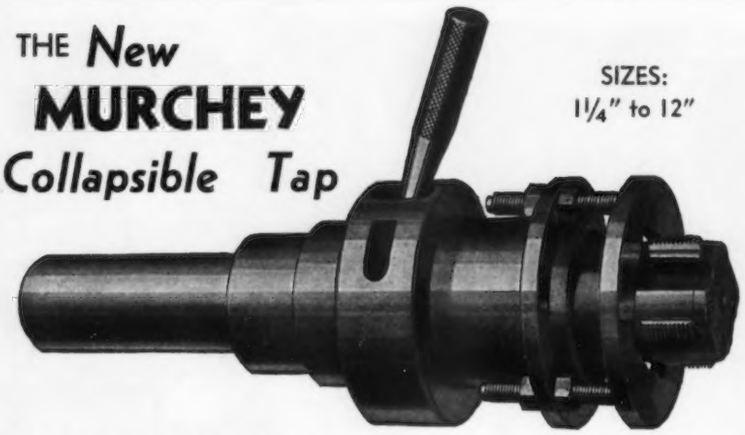
CARNEGIE STEEL COMPANY • PITTSBURGH
Subsidiary of United States Steel Corporation
277

CARNEGIE
Floor Plate



THE *New*
MURCHEY
Collapsible Tap

SIZES:
1¼" to 12"



Here is a tool with all the features that go to make up the ideal collapsible tap. First, of course, it is a precision tool guaranteeing accurate, true threads.
Second, the collapsing mechanism is simple and positive—the chasers cannot jam or stick.
Third, the chasers can be quickly and easily removed for grinding, without removing cap.
There are other reasons why this tap can save money for you. Ask about them.

MURCHEY MACHINE & TOOL CO., 951 Porter St. Detroit, Mich.

Machining Work on the Buick 40

(Concluded from page 13)

thus preventing interference between tools and transfer bars.

Various operations on the miscellaneous angular holes in the crankcase are performed on a Greenlee special four-station straight-line combination drilling, chamfering and tapping machine. The work enters the machine at the right-hand end in station No. 1, with the bottom face down and the distributor side to the rear. It is tranferred manually from one station to the next after each operation. Each station has its independent locating and clamping mechanism as well as independent feed, making each station a complete machine in itself. All drilling and chamfering work is done in the first three stations and the tapping work in the final station.

Operations in each station are as follows:

First Station
- Drill five S (0.348 in. dia.) oil holes through oil gallery to camshaft bearings 3 in. deep.
- Drill, counterbore and chamfer distributor hole.
- Drill ½ in. oil hole from pump to oil gallery.

Second Station
- Drill five 5/16 in. oil holes from crankshaft bearings to camshaft bearings.
- Drill one G (0.261 in.) hole through distributor hole 3¾ in. deep.
- Drill two G (0.261 in.) holes in face of distributor boss.

Third Station
- Drill five S (0.348 in.) oil holes through to camshaft bearings from oil gallery.
- Chamfer two G holes in face of distributor boss.
- Semi-finish ream distributor hole.
- Drill 17/64 in. oil gage hole.
- Chamfer one G hole on side of distributor boss.

Fourth Station
- Tap five holes from oil gallery to camshaft bearing.
- Tap two 5/16-18 holes in face of distributor boss.
- Tap one 5/16-18 hole in side of distributor boss.

In each of the three drilling stations is a Greenlee standard cam feed unit which, through racks and pinions, feeds all other drill heads in that station. All drilling units are independently adjustable for depth of feed, but the total stroke of each rack-feed head is dependent upon that of the cam feed unit. The feed in the first three stations is electrically controlled by a push button operating in conjunction with a solenoid controlled clutch. In the fourth station all tapping heads are independent of each other with regard to stroke, adjustment and control, each having screw feed and being driven by a reversing motor with a limit switch and push button control.

Chamfering Cylinder Bores

Top and bottom of the cylinder bores are chamfered on a Foote-Burt eight-spindle, hydraulically operated machine. An expanding type tool is used which is actuated by means of collars located on the tool shanks. The collars, in turn, operate the expanding device to secure proper lateral movement of the cutting tools. The fixture for this work is of a tunnel type, the cylinder block passing directly through it.

For final finish reaming the valve lifter guide holes in the cylinder block a Foote-Burt 16-spindle hydraulic feed drilling machine is employed. For this operation the block is loaded with bottom face up in an elevating type fixture, which has sufficient movement to bring the block up to the fixed locating pins to locate from the cylinder bottom surface. Floating type ream holders are used. Similar machines are utilized to straighten and semi-ream the valve lifter guide holes, and a heavier type machine for rough drilling. On the rough drilling, straightening and semi-reaming operations the cutting tools are guided by means of a bar inserted in the camshaft bores, which is moved hydraulically in and out of the fixture. On the rough drilling machine it was found necessary on account of expansion in this bar, due to heat from the cutting action of the drills, to add a coolant system in the end housing so that when the bar was drawn from the fixture, the coolant would pass over it.

A Foote-Burt eight-spindle horizontal type cylinder boring machine, hydraulically operated, takes the second cut on the cylinder bores. This is termed a straightening operation and is followed by a multiple spindle reaming of the bores and two honing operations to finish. The multiple spindle head of this machine is driven and fed by means of a standard hydraulic unit mounted directly behind the head. The motor which drives the spindles also drives the hydraulic pump for feeding the head to and from the work.

The fixture is a novel feature of this machine. It also is hydraulically operated, four clamping plungers being used to clamp down the top of the cylinder block. In addition, a hook type hydraulic clamp is pressed against the upper part of the lower flange of the block. The hydraulic clamp mechanism of the fixture is operated from the regular plant air supply, the air valve for controlling the mechanism being located just ahead of the main guide bushing plate of the fixture.